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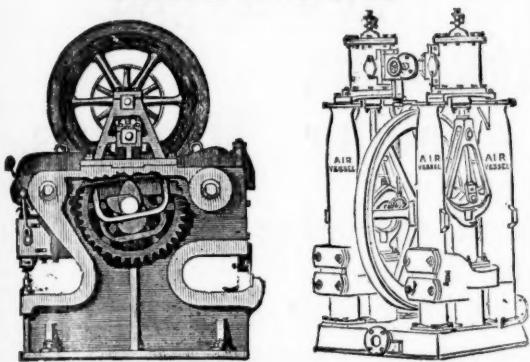
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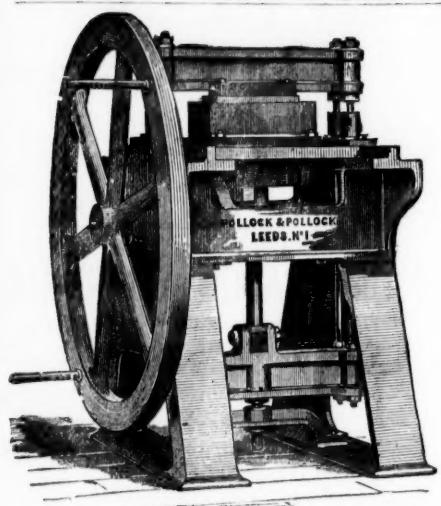
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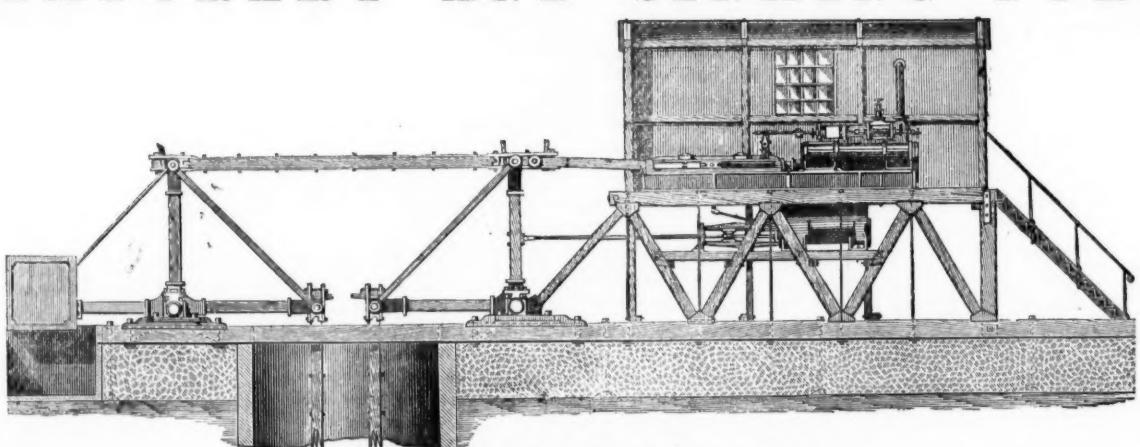
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[This Advertisement appears fortnightly.]

Original Correspondence.

TIN MINING IN LARUT—No. III.

BY P. DOYLE, C.E., F.S.S., M.R.A.S.

(Formerly of the Kurhurbarlee Collieries, East Indian Railway, Bengal.)

Water is the great agent in the mining operations in Larut. Without water, or with only a limited amount, a claim that would have been otherwise highly productive may either become valueless or only capable of affording very irregular returns. It would be impossible to cleanse the tin ore (sand) from the different earthy materials with which it is associated, or to turn the clumsy water-wheels by which the pits are drained, without this essential requisite, and it is the chief and a very fertile cause of dispute among the miners. Its want was at one time considered such a great difficulty in the working of the mines that the apprehensions of Government were carried into the form of a proposal for the construction of reservoirs for a supply to meet certain contingencies at a cost of 25,000L. It was fortunate for the country that no funds were available for carrying the scheme into execution, and the project has now been consigned to the limbo of a good many official ideas of interest and importance—all alike more or less purporting to benefit the community and remunerate the State. The mining area has since the idea was first entertained, in 1874, increased largely, and is still increasing—the outgo also increasing, as will be seen subsequently, in a much more favourable proportion. The difficulties regarding water supply arise more from waste and indiscriminate working than actual want, and, all things considered, the only remedy available—consistent with a non-interference with experience with existing rights and the extension of the workings—is steam pumping machinery, to the advantages of which the present head of the administration (Mr. Low) is fully alive. The rainfall (already mentioned) is distributed throughout the year, which, coupled with the physical aspects of the country and its position within the zone of perpetual deposition, all place beyond the possibility of doubt that the anticipation of periods of long-continued drought were raised on very insufficient grounds.

When a sufficient quantity of tin dirt has been collected near the washing-place the operation—which corresponds with the Cornish boulding—commences. The appliances for this purpose in Larut are much the same as some of those once in use in the placer washings of Australia and California, but more particularly the Tom or Long Tom of the latter, which is a very close approach to the sluice-boxes universally employed in the Larut washings. These boxes are little else than a trough or gutter, formed of three planks, of from 20 to 30 ft. in length, having the channel from 2 to 3 ft. wide, and from 1 to 2 ft. deep, and placed at varying grades, dependent upon length, but the inclination never exceeding an angle of 10°. It is obvious, also, that the water supply available for washing should be an important consideration in regulating the cross section and fall of the channel, and the Chinese appear to be fully aware of the fact—the object being to obtain such a velocity that the water after disintegrating the dirt in flowing down will carry on with it the gravel and earth, leaving the heavier tin sand to sink in the trough behind riffles or cross slats, of which there are only two—one about 5 ft. from the upper end, and the other 2 ft. above the lower end. After a sufficient quantity of tin dirt is thrown into the gutter and a stream of water turned on three men travel in the box with cankoks or hoes, by which the puddle is kept constantly stirred, and one man is employed with a rake, removing the large stones, and throwing back against the current such portions of the wash-dirt which require further disintegration. Three men are necessary for clearing the tail of the small stones and sand which gradually accumulate at the bottom, while a fresh supply of tin-dirt is shovelled in at the head of the trough. The Chinese, as a rule, always work with a heavy stream of water, and, no fork being used as in Australia and California, the stuff is either carried through before it is sufficiently washed, or the force of the water carries off much of the finer particles of tin sand, which are thus practically lost to the undertaking. Great improvements might be made here with a view to prevent at least a part of the loss which attends these operations. That this loss is high, and perhaps excessively so, is proved by the circumstance that in some of the workings a second washing is frequently considered necessary, and in others the more industrious of the miners find it worth their while to devote their leisure hours to the same purpose. The yield of tin sand varies from 1 to 2 per cent. of the tin dirt. The cost of washing is generally included with that of getting, and correct observation, coupled with careful enquiry, show that it requires generally 900 units of a miner's ordinary working day to produce 32 peculs of tin sand—the range being between 800 and 1000, and rate \$2 per unit. This will be reverted to in the statistics of labour and cost of production, to follow hereafter.

On the termination of the washing the ore, in the form of a black, heavy, fine-grained sand, is taken to the smelting-house.

It may not be out of place to mention that the Chinese miners believe the tin ore to be under the guardianship of demons, whom they anxiously endeavour to propitiate by offerings. Formerly they would not permit anyone to cross the ore streams, but now they are constrained to confine this prohibition to persons with shoes going down into the pit where the ore is lying.

The only known instance of an attempt being made to introduce the European methods of working in the extraction of tin ore in the Larut mines was that made by an Australian miner, Mr. Wm. Scott, from Melbourne (under the writer's superintendence), and the following results of one of the experimental adit levels driven into the face of one of the pits may possibly interest those connected with the tin industry elsewhere:—Section of working: height, 4 ft. 6 in.; width, 3 ft. 9 in.; length on the clear, 24 ft. (= 7 sets, 4 ft. from centre to centre). Timbering: 7 sets, each set including side, cap, and sole pieces, requiring 16 running feet of timber = 112 at 4 c. a foot = \$4 48 c. and 4 tap and 2 side laths between each set = 36, at 8 c. a lath = \$2 88 c.; labour in making and fixing, 2 carpenters for 10 days = 20, at 60 c. a day = \$12; total cost of timbering, labour, and materials, \$19 36 c., or 80 c. a foot driven. Getting: 3 men for 10 days = 30, at 40 c. a day = \$12; 5 men for 6 days = 30, at 30 c. a day = \$9; 8 coolies on occasions, at 25 c. = \$2; total cost of getting, including removing, 382 5 cubic feet of tin wash or dirt, \$21, or 87 c. a foot driven, otherwise 18 cubic feet a dollar, or averaging nearly 6 cubic feet per man per day. This result is unreliable, as a great deal of the labour was dissipated in balling. Washing: 1 overman, at 40 c. a day; 10 men, at 30 c. a day = \$3; total cost of washing, 382 5 cubic feet tin wash or dirt, \$3 40 c., or a little less than 1 c. a foot, otherwise nearly 1 1/2 cubic yard per man per day. The quantity of tin dirt or wash extracted = 382 5 cubic feet—yielded 4 58 cubic feet, or 1 1/2 per cent. of tin sand, weighing 571 catties, affording a specific gravity of 2 66, or a little over one-third of that of the white metal.

The causes which necessitated the abandonment of the working were—1, an obstruction, and, 2, frequent flooding—both of which would have entailed unnecessary expenditure by a continuance of the operations, the latter being a disadvantage (from the contiguity of a sump) which might have been avoided, but the former (fallen drift timber of a bygone period) is a contingency which might be expected in alluvial (tin) ground anywhere in Larut.

The undertaking was financially successful, for the 571 catties of tin sand, the outgo of the working, was sold (at 8 c. a catty) for \$45 68 c., and thereby covering the working expenses, which aggregated \$43 76 c., besides leaving a margin of more than 4 per cent. to profit in less than a fortnight's operations. The further the working extended the proportionate cost would have decreased, leading only to one inference—that under more favourable conditions, backed by recent experience in similar undertakings, better results must be a consequence more than possible, if not an absolute certainty.

In concluding the part of the subject relating to the extraction of the tin ore a few words may be added regarding a very good and, at the same time, extremely simple test for the detection of the presence of this substance from among the many varieties of black sand with which it is likely to be compounded. It may not be generally known, and it will doubtless surprise many to learn, that

if a few grains of the crystals of tin ore be first crushed with a hammer, and afterwards ground down in a glass or agate mortar, the resulting fine powder will be of a fine pink colour. Foreign adventurers prospecting for tin invariably apply this method, which is stated to answer well—in fact, they carry a sort of diamond mortar, expressly constructed to facilitate its application. Iron sand will be found to be irreducible under the pestle, and will not change its black colour.

The spring level of the country may be taken at a depth of 6 ft. below the surface of the ground, and, accordingly, when the excavations have reached about this depth, and water is struck, it is then only that the miners' difficulties may be said to have commenced. The percolation of water into the workings from the comparatively porous soils which overlie the ore stratum is very great indeed, which is in a great measure due to the numerous water-courses intersecting the workings, as well as the high rainfall and other causes.

The mines being entirely quarries or open excavations, the effects of a tropical downpour may be easily imagined. The abandoned or disused mines also become so many pools or, as it were, reserves, from which water oozes into the neighbouring workings. There is one continued struggle between the miner and this element for supremacy, in which the Chinese rises superior to the difficulty by bringing his proverbial ingenuity to the rescue—the result being the Chin Chia or chain-pump, where the element is turned against itself, and water utilised to overcome water.

The reader will now commence to understand that the "want of water" as applied to the Larut mines has only a local signification—implying a deficit in the streams which proceed from the higher grounds into the mining area, and are there used for turning the water-wheels, which work the pumps engaged in draining. The subject has been adverted to before, but its importance will be the only excuse for reiterating that steam-pumps are indispensably necessary for the development of the tin industry in Larut, and it will amply repay any investment made in this direction.

The chain-pump in use by the Chinese in the Larut mines is only a modification of appliances long known in Europe and the East.* It consists of a wooden gutter or working barrel, placed at an angle which seldom exceeds 20°. A fair average of the existing grades is 1 in 6. The gutter or trough is from 12 to 16 in. high, and from 4 to 6 in. wide, and of lengths ranging up to 100 ft., composed of three single planks. A few inches above, and supported by framing attached to the sides, a fourth plank or platform runs for the full length parallel to the trough. An endless wooden chain, with wooden blades, about 1 foot apart, on each side of the link, is exactly fitted to and works in the wooden channels, passing over two pulleys, one at the upper and one at the lower end. The upper pulley is on the axle of an overshot water-wheel, driven from the tail race of the mine higher up, or directly from the head race, and the pulley at the lower end of the pump, which is submerged, guides the blades which travel down the platform and up the trough, the water drawn up by the floats being discharged into a channel at the head. In some of the smaller workings the pump is worked by coolies, by means of a treadmill on the shaft of the upper pulley, and in a few instances formerly buffaloes are said to have been the motive power.

The water-wheels† in the Larut mines are from 4 to 5 ft. diameter, and from 2 to 3 ft. breast. The fall at each pump, its lift, and performance vary, and the following statement supplies all needful information on these heads:—

| No. | Fall (feet). | Lift (feet). | Cub. ft. Gallons | Ratio. per min. per hour. | Trough. Inclination. (feet). |
|-------|-----------------|-----------------|---------------------|------------------------------|------------------------------------|
| 1 | ... 5 1/2 | ... 14 0 | ... 9 57 | ... 3588 75 | ... 18, or nearly 1 1/5 |
| 2 | ... 6 | ... 13 2 | ... 7 63 | ... 2861 25 | ... 18, or over 2 5 |
| 3 | ... 5 7-12 | ... 9 0 | ... 4 17 | ... 156 75 | ... 125, or 1/6 |
| 4 | ... 5 1/2 | ... 20 5 | ... 4 27 | ... 1601 40 | ... 36, or over 1/3 |
| 5 | ... 5 1/2 | ... 13 0 | ... 4 40 | ... 1672 59 | ... 971, or 1-10 |
| 6 | ... 5 1/2 | ... 10 5 | ... 8 04 | ... 3015 36 | ... 18, or nearly 1/2 |
| Means | | ... 13 4 | ... 8 36 | ... 2385 00 | ... 22, or over 1 5 |
| | | | | | ... 9 1/2 ... 87 |

The pumps were selected indiscriminately from the Asam Kumbang and Tapai sections, and the measurements were taken on a morning succeeding a night of heavy rain, when the wheels were working under favourable conditions.

ON UNDERGROUND HAULAGE—No. II.

SIR.—Hauling by main and tail ropes is almost the rule in the Durham and Northumberland coal mines. The hauling engine is sometimes placed on the surface, near the top of the pit, having the boilers adjacent to it; but this plan causes additional friction on the ropes, from the turns at the top and bottom of the pit, and as will be seen from the following examples, rope friction absorbs a large proportion of the prime power. The usual method is to fix the hauling engine near the bottom of the drawing pit, so as to bring the train of wagons direct into the sidings; this, if near the upcast pit also, will be the most advantageous position for the engine in getting its supply of steam from the boilers on the surface, and also in exhausting steam into the upcast pit.

The following example of a hauling steam-engine so placed in proximity to the upcast pit, and behind the drawing pit, in a coal mine in Durham, is a good illustration of the principle of hauling by two separate ropes and drums. The engine has two 24-in. horizontal cylinders, 3-ft. stroke, geared in the ratio of 2 to 3. The cylinders are placed 5 ft. apart from their centres; from the cylinders to the crank shaft the distance is 10 ft.; on the middle of this shaft is fixed the fly wheel, 10 ft. in diameter, weight 5 tons. At each end of the crank shaft a pinion is fixed, 4 ft. in diameter, working to a spur wheel, 6 ft. in diameter, at the side and on the same shaft, with each a drum is placed, the drums being 10 ft. apart from the middle of each. The drums are 5 ft. in diameter, 3 ft. wide, and are put in or out of gear by sliding carriages. The engine is also constructed to pump water, a small double-acting plunger-pump being placed at the back end of each cylinder. The length of steam-pipe is 133 yards, and of exhaust pipe 100 yards.

The engine plane is in two sections; the main way to the north is about 3000 yards in length; from a point on this plane 1500 yards in a branch runs off to the west, being 850 yards in length, or 2350 yards from the pits. While the set of wagons is at the pit the ropes are changed, so as to send the empty set of wagons into either north or west district, as required, without stopping the train on its journey to either extremity. The length of main rope required for the north way is 2990 yards, weight 5 tons 6 cwt., and of tail rope 5820 yards, weight 9 tons 2 cwt. The length of main rope required for the west way is 2200 yards, weight 3 tons 18 cwt., and of tail rope 4710 yards, weight 7 tons 2 cwt. The main rope is 3 in. in circumference, the tail rope 2 1/2 in., equal 6 1/2 lbs. per fm. The rope sheaves on the main road are 5 in. in diameter, placed 10 yards apart, those for the tail rope are 8 and 14 in. in diameter; there are other larger binding sheaves at turns, and the return wheels are 7 ft. in diameter. The rails are being laid at 28 lbs. per yard, properly fished and jointed; gauge of road, 22 1/2 in.; weight of wagon empty 5 1/2 cwt., each carrying 9 cwt. of coal.

The gradients in the north way vary much; from the extremity there is a rise outbye of 1 in 7 1/2 to the summit, from that point to the west way end the fall outbye averages 1 in 108, from thence to the pits the average fall is 1 in 376. At the extremity of the west way there is a distance on a level, then a short rise outbye of 1 in 22, then an average fall of 1 in 55 to the west way end.

Experiments were made with the coupled engines with the object of determining the power developed in them, first by running the engines alone; second, running them by ropes only; and, thirdly, with a set of wagons, laden and empty, in each direction. With a set of 90 full wagons drawn outwards, the weight of the wagons and coal being 65 tons, and the speed at 48 revolutions, equal to 558 ft. per minute, on a steep gradient outbye, the indicated horse power was 88 in one cylinder and 78 in the other = 166 horse power. Steam pressure in receiver at same time 29 lbs. per square inch. Another trial with the same load on a level gradient indicated 135-horse power; the average of the two trials was, therefore, 150 1/2-horsepower. There is no automatic steam regulator by means

of a governor with this engine; the steam is admitted or reduced as required by the attendant. The indicators were applied directly to the ends of the cylinders, not to pipes, the latter not giving correct results. With a set of 90 empty wagons drawn inbye, on a rise of 1 in 540, at 64 revolutions per minute, and a rope speed of 737 ft. per minute, the indicated horse power was 68 in one cylinder and 60 in the other, equal together 128-horse power, on the level.

The ropes when coupled together and run without wagons at 72 revolutions per minute, and a rope speed of 1054 feet per minute, the indicated horse power was 43 in one cylinder, and 34 1/2 in the other, equal 77-horse power; steam pressure in the receiver 26 1/2 lbs. per square inch. With the drums disconnected from the engine the indicated horse power of both cylinders was 183, at 68 revolutions per minute and 32 lbs. steam pressure. It thus appears that the power lost in rope friction and engine friction inclusive is 51 per cent. of the power exerted in drawing out the full wagons, and 60 per cent. loss on the power exerted in drawing the empty train inwards; of this 12 per cent. is absorbed by friction in the engine alone.

Similar experiments were made with trains in the west way, giving in result 74-horse power absorbed by the friction of ropes and engine at 72 revolutions per minute. Though this way is much shorter than the north way, the number of curves in the west way cause the rope friction to be nearly equal to that of the north way, indicating the importance of having main roads straight and as free as possible from turnings. The average horse power required to bring the laden wagons out from the west way at 64 revolutions, and a rope speed of 781 ft. per minute, was 123; steam pressure 27 lbs. per square inch. There were 80 wagons in this train, equal to a weight of 57 1/2 tons. The gradients were a fall of 1 in 540, and on another part level.

The power required to take the set of 80 empty wagons into the same way was nearly 125-horse; in a rise of 1 in 51 and on the level steam pressure 29 lbs. revolutions varying from 58 to 70 per minute. It will be observed that the last power corresponds nearly with that of the empty train in the north way, though the number of wagons in the train is less, and the distance shorter; this may be accounted for by the curves in the road, by the deflection of the tail rope over a sheave to work a pump, and by the more frequent application of the brake in running inbye, for which it would be difficult to give the amount of power absorbed. The total weight of a train of 90 laden wagons is 65 tons to be drawn from the north way; at the starting of this load the weight of the main rope (5 tons 6 cwt.) would have to be drawn, as well as half the weight of the tail rope (4 tons 11 cwt., or together 10 tons 17 cwt.; about one-sixth of load); but the rope friction being much greater than the wheel friction, the great absorption of power by running the ropes only in comparison with running with full and empty trains is in some degree accounted for.

Having at some length detailed these experiments, principally because they must be useful and interesting to practical mining men, as showing the sources from which arise loss of power in working engine planes, and how these can be in some degree abated by straight roads and uniform gradients, as far as practicable, straight pull from the plane to the engine, and easy running and light sheaves for the ropes. Whether the prime mover of the engine is steam or compressed-air, the result will be much the same in useful effect performed by the engine.

M. E.

Nov. 5.

ECONOMY IN FILLING SKIPS.

SIR.—For the information of Mr. Henry Brewer I may inform him that the plan for filling skips which has occupied his time and attention so long is a very old plan indeed; it was at work in Cornwall some 16 years ago, and the writer of this had a similar plan and appendages fixed in an iron ore mine about six years ago at Winford, Somersetshire, yet, although the stuff is handled over by the trammer after a fall of (say) 8 ft. from the top to the bottom plate, chokes sometimes occurred which did the shoot no good. Has Mr. Brewer ever tried it, and found it work satisfactorily at the mine he is engaged at in Bailen, Spain?

J. J.

Nov. 5.

MACHINE MINING—THE ECLIPSE DRILL.

SIR.—I noticed in last week's Journal a description of the Eclipse rock drill. Referring to the specification of the patent for this drill (Elliott, De Pass, No. 629, A.D. 1878), may I ask you to find room for the following passage quoted from it, and the succeeding one quoted from the specification of my patent, No. 3342, A.D. 1874:—"The valve box, A, is provided with exhaust ports, c c, for the valve pistons, and these ports are carried across and to opposite ends of the valve box, and they lead down into the steam cylinder, C, through passages, d d. From this point the exhaust is carried by a groove or recess, f, turned in the piston, E, and thence by the openings, g g, in the cylinder to the main exhaust port, and without having any connection with the steam or air which is in either end of the cylinder. This constitutes a very great improvement in the invention."

"The operation of the machine is as follows:—When the air or steam enters the valve box it is admitted between the valve pistons, and supposing the valve to be resting against the lower end of the valve box, it will be seen that the exhaust from this end of the valve box is closed because the main piston lies over the passage, d, whilst the other end of the valve box is free to exhaust because the groove or recess, f, is in position to leave open the port, c, through the tube, d, and thence from the recess, f, through the opening, g, into the main exhaust port, D. It follows that the valve would receive a pressure upon its lower piston, whilst the other end of the valve could not, therefore the valve must rise, and in doing so the main supply port, j, to the lower end of the cylinder is opened, and at the same time the exhaust from the upper end being freed, the piston immediately begins to rise, and its recess, f, on reaching the exhaust port, c, of the lower end of the valve box, allows the steam or air under the piston, a, to escape through the tube, d, and through the passage, g, into the main exhaust port, D. This returns the valve back to its first position, and in doing so the main supply port, j, to the upper end of cylinder is opened, and the exhaust by the lower main port, j, is freed, which causes the piston to descend towards the rock, and the groove or recess, f, on reaching the exhaust port, c, of the upper end of the valve box, allows the steam or air above the valve piston, a', to escape through the tube, d, and thence through the passage, g, into the main exhaust port. This downward stroke of the piston closes the exhaust from the lower end of the valve box, and opens the upper end, thus causing the valve to rise and continue the motion. It should be observed that the openings, g g, are connected with the main exhaust port, D, by an opening, x, cast in the cylinder, and which is shown by the dotted line in Fig. 6. The small ports, i i, in each end of the valve box are made so as to extend just within the valve pistons, and they serve to admit a puff of air or steam to accelerate the starting of the valve, and as the valve moves from either end of the valve box these pistons instantly close the ports alternately."

The third claim is—"The use of ports arranged in the valve box substantially in the manner shown being carried across to opposite ends of same, so that the exhaust steam or air from opposite ends of the valve may be controlled by the groove or recess in the main piston, as herein described." And the fourth claim is—"The means employed for controlling the valve by the

valve to the other end of the small cylinder, *f*. In this arrangement the ends of the passages, *m m*, should pass into the cylinder, *a*, near the centre of the length of the latter in order to prevent the piston, *l l*, from having too short a stroke."

Referring to these two specifications, may I ask the patentee or manufacturers of the Eclipse drill to say in what respect the arrangements as described above differ, for to me they seem to be in every material point absolutely identical?

The fifth claim in the Eclipse specification, for the use of a rotating bar and screw, formed of one piece of metal, or connected together, by means of which the feeding and rotation are made one operation, is by no means new (see No. 2013, A.D. 1875).

Southampton Buildings, Nov. 6.

E. EDWARDS.

THE GREAT NORTHERN RAILWAY.

SIR.—Landowners' rent rolls have been subjected to serious rebate by reason, thanks to modern idiosyncrasy, of so-called free trade, forsooth, with States which, in lieu of reciprocating, levy prohibitory duties on our manufactures, culminating in one great cause of the prevailing stagnation of industry and commerce in this kingdom. Without enumerating the various countries entering into this category, which would necessarily launch me into unpardonable prolixity, it may suffice to name Russia, which, depending chiefly on this country for the disposal of her cereals, timber, flax, &c., imposes insensate fiscal restrictions on our staple exports. Land is offered in the most fertile zone of Russia—Podolia, Ukraine, Poltava, Koursk, and Chernigow—at 25 roubles the dessiatine, or 26s. the English acre, without finding buyers; descending, in the steppes of the Crimea, to 75 copecks, or 9d., an acre; the average freight of Russian grain to this country in 1878 being under 4s. a quarter. With the improvement of her vast water-courses, and consequent greatly reduced cost of transport, the landowner in this country will be placed in a still worse position, which already is reacting so severely on the agricultural labouring population. Is it possible to realise the fact of still greater disaster befalling the landowner and his dependants through the illegal conduct of the Great Northern Railway Company, as hereinafter set forth? The tocsin has sounded, and the law must be respected and carried out in its integrity. Our legislators have enacted just laws affecting the exploitation of railroads, by prohibiting any preference to be given to any particular element of traffic, than which nothing can be more distinct and set forth with greater perspicuity in the Traffic Act, quoted in my letter in last Saturday's Journal. But let us contemplate the application of the law. Mineral property in the vicinity of a railroad having access to the Metropolis, as the Great Northern Railway is *ipso facto*, as the law is now contravened, greatly enhanced in ephemeral or transitory value. Competition with sea-borne traffic, my correspondence in the Journal of Oct. 19 and 26, and Nov. 2 shows, has reduced the Great Northern coal rate to less than 3d. per ton per mile to the Metropolis, entailing a heavy loss on the shareholders who, along with their Midland fellow-sufferers, have already been victimised, according to the Times, to the terrific loss at the rate of 300,000/- a year in 1871 in this identical coal traffic. Fraser's Magazine of this month states—"The railways of the United Kingdom have, as commercial undertakings, concealed their items of expenditure." We know how sensitive the Stock Exchange barometer is. The Railway Times of Oct. 19 states—"Accusations of paying dividends out of capital have been made against the Great Northern." The Times observing—"The necessity of a radical change of the system of audit is imperative." An immense undue advantage accrues to the landholder simultaneously owner of mineral property over the ordinary landholder bereft of the benefit of any such geological boon, and restricted to the surface of the soil, who in lieu of less than 3d. per ton per mile transit cost is mulcted with 1s. 3d. or fortyfold more than his neighbour. Were the same measure of justice meted out to the surface landowner we should witness an immense increase in the value of land for the cultivation of agricultural produce, and for building sites—the greatest conceivable benefit conferred on the working classes, which I shall develop in my next letter. The building trade would be raised from its prostrate state. The question is too serious to brook delay, and the mandate of public opinion, under the aegis of the inviolability of the law, will be supreme. How deplorable if the Glasgow Bank collapse should be the forerunner of more terrible disasters on the part of incriminated officials. Towering spirits have fallen, and it is to be wished the railway magnates may have occasion to reiterate the words of a crest-fallen octogenarian diplomatic celebrity—"Nous avons soufflé sur ce nuage, qui obscurcissait notre grandeur, et il s'est évaporé." I have had the privilege of ventilating my steps at the Board of Trade and at the Railway Commissioners department, and I have not met with anyone dissenting from or controverting the views I have enunciated. "Le respect ferme la bouche."

WILLIAM JOSEPH THOMPSON.

6, Fitzwilliam-road, Clapham, Nov. 7.

CITY OF GLASGOW BANK—UNLIMITED LIABILITIES.

SIR.—The following letter appeared in the *Mining Journal* August, 1868, and the stoppage of the City of Glasgow Bank justifies its reproduction after a lapse of ten years:—"The success that unquestionably attended joint-stock banking from its first introduction into this country indicated rapid growth and wide spread public recognition with cheering prospects of permanent prosperity whenever the rules and principles of sound finance were observed. For a series of years these undertakings commanded great and deserved attention, being favourably regarded as profitable mediums for the safe employment of capital. The profits were great and the dividends large, while the business was healthy, remunerative, and capable of extension. The shares rose in price, from the demand exceeding the supply, and to all appearances sprung solely from a desire on the part of the investing public to embark therein. Thus commenced that mania for banking institutions and growth of premiums on original shares that ultimately ended in grief and disaster to so many associated therewith. Prospects of new companies were issued in rapid succession, and received with eager greed by an exacting public. Thus encouraged, speculative as well as legitimate promoters entered the field, and while the former fed the morbid desire to realise unreal wealth in the shape of fictitious premiums, or otherwise visionary profits, through buying and selling shares in an inflated and feverish market, the latter succeeded in establishing those great useful and profitable undertakings that now occupy such exalted—nay, necessary and indispensable—positions in the conduct and administration of the commercial affairs of the nation. It appears to us, however, that banking business and banking risks are still very imperfectly understood by the investing public, notwithstanding the revelations of the years 1866, and 1867 and the direful attendants on the collapses of so many establishments. . . . That joint-stock banks are trading companies there can be no doubt; that profitable trading companies should command a market premium for their shares is beyond question, and further that the prestige of past successes should command confidence in the future administration of affairs is likewise certain. Hence the London and Westminster Bank stands out not only in an exalted but also in an unrivalled position; still the question arises, will the dividends on 2,000,000/- capital materially augment the gains on 1,000,000/-, when probably the current and deposit accounts, now amounting to 19,000,000/-, will not augment in proportion? Should the dividend be reduced from 24 to 12 per cent. on the 20/- paid, price of shares 71/-, is equal to about 30 years purchase, and from which no one can retire without being responsible for obligations three years after transfer of shares, with direct commitment to future calls of 80/- a share in case of necessity. Surely the late crisis will prove of little avail if banking companies be not regarded with some degree of suspicion. The many failures and the sad and lamentable disasters entailed on thousands of individuals should act as a warning to others, and although all must admit that the 2500 proprietors of the London and Westminster Bank are as safe and well protected as they possibly could be with any similarly constituted company, still we contend that six to eight and up to ten years purchase of dividends is enough to give as a premium for embarking money in any trading concern, no matter how bright

may be the prospects, or extended its influence, for experience has shown that the most affluent and prosperous undertaking may be rendered prostrate by the effects of circumstances against which the most elaborate and guarded precautions would not prevail."

Ten years ago the price of shares was 71/-, against 60/- this day. The liability of shareholders between themselves is increased from 80/- to 160/- per original share; 30/- per share has been called up, 20/- capitalised and 10/- added to reserve, all of which was lost through Collie and Co. The liability to the commitments of the bank are unlimited, hence the rich will have to pay for the poor in case of disaster and grief. The £50,000 part of the bank ten years ago was worth 71/-, now it is marketable (two shares) at 120/-, with 30/- called up, or (say) 90/-, as against 71/- a decade ago, with one moiety of the direct responsibilities.

The collapse of the City of Glasgow Bank spreads misery and desolation broadcast, and shows clearly that unlimited liability is not applicable to joint-stock banks—1. The directors and executives are dealing with the money of others and not their own—2. The shareholders have no control over their own responsibilities or the conduct of their business—3. Experience proves that directors and servants are only mortals, and have a leaning towards themselves and friends, hence the gigantic advances made on speculative and questionable securities by the City of Glasgow Bank.—4. Anyone acts absurdly who commits himself to unlimited liability when he can exercise no voice or control on the actions of the executive: hence we advise one and all to realise without delay shares in unlimited banks, for in our opinion it is only a question of time when the best will succumb. A stern chase is usually a long one, but the finance of the day is based on competitive speculative profits. Security has been succeeded by forced business, which partakes more of the principles of pawnbroking than healthy and legitimate banking.

The cost-book is unlimited liability, with these distinctive elements from joint-stock banking that shareholders supervise and transact their own business, with the power of retreat at any moment, and are liable only for their individual proportion of indebtedness, while such mines as the following possess attraction and prospective expansion in no instance equalled in joint-stock banking—Pant-y-Mwyn, East Pant-du, Lead Era, Pately Bridge, and others of similar calibre and promise.

R. TREDINNICK,
Consulting Mining Engineer.

Union-court, Old Broad-street, London, Nov. 6.

NEW QUEBRADA COMPANY.

SIR.—A fortnight ago you were good enough to insert a letter from me suggesting to the directors the propriety, for reasons then stated, of furnishing to the shareholders some information as to the condition of the mine and its position with regard to the Railway Company. No reply has been made to that suggestion, but I cannot help thinking that there is greater force now even than there was then in the reasons I urged in favour of publicity. I stated that certain parties were evidently under the belief that a considerable improvement had taken place in the mine, particularly with regard to the output of mineral. Since then it has become known in the market that a sale of a large quantity of Quebrada ore—it is said even 1000 to 1500 tons—has been made within the last few days. Such a quantity as this not so very long ago would have made a sensation. I will not do the new directors the injustice even of implying that information such as this indicates is withheld. But, Sir, so long as we do not know what is going on the effect is the same, and I do say that any shareholder who may now be induced to sell his shares, if there is substantial improvement in the condition of the mine, will have grave cause for complaint.

A SHAREHOLDER.

THE RICHMOND MINE.

SIR.—On Wednesday next this grand property will be either considerably enhanced in value or it will very materially suffer—which it shall be must depend upon the action of the shareholders. If shareholders will show determination to have a united board of directors they must support the Chairman and his party—which is commonly termed the Probert section. They will thus secure for this company a prosperous future. In spite of the great mistake made in sending out a commission of enquiry to the mine, a second enquiry has been made—no doubt to support the report given in by the first batch. It is too late in the day now to blind the shareholders. We are perfectly satisfied with the mine, and its management there is also satisfactory. A little judicious weeding of the London board of directors is all that is wanted. I, for my part, shall decidedly support the men who appear to me to have the greatest knowledge of mining—I need scarcely say who they are.

A SHAREHOLDER.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR.—As a shareholder of five years' standing, and holding over 500 shares in the company, I naturally feel a deep interest in its prosperity. I have ever regarded it as a most valuable property if conducted by men of practical experience and honesty at the mine. I have had proxies along with a circular forwarded to me by H. N. Randolph Stewart, asking me to join in ousting some of the directors recently appointed, as the company's interests will suffer if they are allowed to remain, and inferring that the report of the late committee of investigation, if carried out, would bring woe to the company. I have no acquaintance with Mr. Probert or any member of the board, but cannot help feeling that it would be unwise to take such a step as removing directors until we have had time to study Mr. Probert's reply (only received to-day) to the committee's report.

Now, permit me to call the attention of my fellow-shareholders to the following plain facts:—At the general meeting of shareholders on May 20, 1875, as reported in the *Mining Journal* of May 22, the Chairman, Mr. Elliott, stated that "the refining works would not only save about 30/- per ton on the actual cost of refining, but that it would enable us to get money from our produce in three weeks instead of three months." At the same meeting Mr. Bridgwater stated that he had received a letter that very day from Mr. Probert referring to the refining process, in which he said—"The process is a great success, and the machinery works like a charm, reducing the expenses quite 30 per cent." When the committee was appointed in August, 1877, and the refinery had been in operation for upwards of two years, from March, 1875, till July, 1877, we only got 27s. 6d. per share of dividend during all that period. Since the committee was appointed 15 months ago, we have received 32s. 2d. 6d. per share of dividends; that does not look like woe to the company. When the committee was appointed shares were freely selling at 4/-; now they are 10/-, or a rise in market value of 324,000/-—that does not look as if the labours of the committee had done harm. Then we had borrowed on debentures in 1876, 37,800/-, a considerable portion of which has been paid off, and as much cash over as would pay the whole—that does not look like a back-going concern.

Surely our shareholders will pause before they change the present direction, and only after mature deliberation and weighing both the committee's report and Mr. Probert's reply. When Mr. Probert started the Rozan process of refining great things were to be done by it. From the starting of the Rozan process at Eureka till the committee visited the place, there appears from Mr. Probert's reply, now issued, nothing but a series of accidents and I presume blunders, but after the visit of the committee the aspect of affairs was completely changed, and profits of great amount were then made. I do not say the committee did all this, but Mr. Probert appears to have waked up, and it is curious to think that profits could only then be found to any great extent. Mr. Probert, in his reply, overlooks the facts as brought out by the committee that coke costs at the mine 6/- per ton, and labour about 4/- or 5/- a day, while in England coke is 18/- per ton and labour 4/- or 5/- a day. Let us, then, try what would be the result of sending 1000 tons of base bullion to Liverpool to refine, where we could at once dispose of the lead, and get the precious metals; and I offer to get charters for the 1000 tons in 200 ton lots from San Francisco to Liverpool at 35/- per ton freight. There would be no fear of peculation by the way, and if it succeeds then bring Mr. Probert's refineries to Liverpool, and appoint him refining manager at a good salary. I would like to see Mr. Probert liberally

dealt with, as I think him honest, but a good deal wrong about refining in Eur.-ka.

A HOLDER OF OVER 500 SHARES.
Scotland, Nov. 7.

ECONOMIC MANUFACTURE OF ZINC.

SIR.—Under the above heading there has been described in the two last issues of the *Mining Journal* Messrs. Binon and Grandif's process for the treatment of complex ores containing galena, blende, &c., and which, on account of the specific gravities of the component parts being so nearly similar, have hitherto completely eluded all attempts at mechanical separation. There can be no doubt that any process which will successfully and economically effect the separation of the various metals must result in large returns to all concerned—the metallurgist or chemist, or both, as the case may be; the miner, to whom the mineral is now almost, if not completely, valueless; and to the country at large by bringing into use many valuable metals hitherto wasted. The bluestones of the Parry Mountain and Ireland, and other mixed ores found in abundance in this and other countries, would at once find a ready market; therefore, any efforts to secure so desirable results should be hailed with satisfaction. Having had some experience with these mixed minerals I should like to offer a few remarks upon the process of Messrs. Binon and Grandif's, as I think the manipulations and results they have described will not be so easily carried out in regular practice. The furnace described appears to be a modification of the old Carinthian and English processes of smelting zinc ores, and also of Graham's patent, and will be found liable to all the inconveniences of those systems, beside others inherent in itself. The furnace bottom and the boxes under same being of cast-iron will, from the intense heat required to distil zinc, be liable to warp and crack, and consequently draughts of air will pass through the crucibles, oxidising the zinc vapour, and converting the metallic lead into oxide of that metal, which will very rapidly destroy the vessels. The calcined mineral containing oxides of lead, zinc, iron, &c., being a fusible compound will be liable, at a temperature lower than that required for the reduction of the zinc, to melt, and running down to the bottom of the crucible (which, although not stated, has I presume a porous stopper to prevent the charge from dropping into the cast-iron box underneath) will present an effectual barrier to the further descent of the reduced lead, and also result in the destruction of the crucible. The admixture of the lead with the zinc in the ore being so extremely intimate I do not think it possible that any considerable portion of the former metal can separate itself from the accompanying mass and drop into the cast-iron boxes provided for its reception. The claim for minimum of non-cooling of the retorts during discharging and charging cannot, I think, be substantiated, because there being an opening both at the bottom and top of each a current of cold air must be rushing through them during part of this operation, whereas with the ordinary Belgian and Silesian retorts there is but one opening, and consequently no draught through them. A few years ago I designed a pebble furnace, having vertical retorts, and heated by gas, but it was subject to all the disadvantages named and many others; the principle is undoubtedly the best, but the attendant difficulties appear insuperable. Messrs. Binon and Grandif appear to confine their process to minerals containing only two metals, but it is very rarely indeed these complex ores are found in that form. Copper almost always accompanies them, and frequently gold, bismuth, antimony, and so on. How do they propose separating these? It will also be interesting to know the loss in calcining, on account of the great heat necessary to properly roast blende, of lead, silver, and other volatile metals. I cannot think the problem of the proper treatment of these ores has been solved by the process described. To chemical metallurgy I believe we must look for success.

Ripley, Derbyshire, Nov. 5.

CHARLES BOUDY.

PROSPECTS OF CORNISH MINING.

SIR.—It is stated in well informed circles that the minimum prices of metals has been reached, a confirmation of which may be inferred from the rise of something like 7s. 10s. per ton on tin, and a corresponding advance in copper ore. In October, 1843, the standard price for common tin reached the unprecedented low price of 48/-, and for copper ore 80/-, the reaction from which caused a rapid rise in the market value of all mining stocks, and that a repetition will follow the great depression through which we have lately passed can be gathered from the fact of many of the leading mines of the county having already taken the start. It must be plain to persons of the most obscure ideas that the mines which have tided over the late calamitous times are now passing a transition state to that of profitable investment, paying a good interest on the capital to be invested, with the certainty of doubling the amount of purchase money in the next few months. Following a similar crisis the Devonshire Great Consols shares (1024ths) in 12 months went from 275/- to 650/- each, remaining at this price for years, paying about 50/- per annum dividends. Here follows a few mines in which the reserves of mineral were probably never in excess of the present, while the shares have receded in market value in some cases to as much as 75 per cent.:—Dolcoath from 80/- to 30/- each; Tincroft from 70/- to 10/- each; Carn Brea from 120/- to 40/- each; and South Cadron from 400/- to about 60/- A person investing a few pounds in the lot is safe to reap his reward in a short time. There is an instance of a much greater depreciation of market value than those above named from no other cause than the apathy of the investing public. A mine some 2½ years since sold at a market value of 40,000/- The pumping machinery (a small rotary steam-engine) becoming inadequate to cope with the increased water, operations were suspended pending the erection of more powerful machinery. The last three months working under such difficulties it cleared a profit of over 1000/-, yet, strange to say, one half of its entirety can be purchased for 500/- It may be said to be in its infancy, being only 50 fms. below adit, and situate in the centre of the richest mining district in Cornwall, requiring an outlay of only 2000/- on machinery account to establish its value as second to none in the county. Another mine in the same district, where at the adit level a course of copper ore 3 tons to the fathom has been driven over for 40 fms. long, and opening sufficient mineral to pay for machinery required for its deeper development without calling on the shareholders for assistance, is selling at a nominal value of 2/- per share, or 5000/- for its entirety, being situate adjoining and parallel to a mine that some years since, under precisely similar circumstances, rapidly rose from 100/- to 2000/- each (93ths). Such are the chances presented to those who take time by the forelock, and have the heart to lay out a few pounds in a judicious selection of mining properties.—St. Day, Cornwall, Nov. 6.

CHAS. BAWDEN.

LEAD MINING.

SIR.—In the interesting article on lead mining in last Saturday's *Journal* after giving the decadal statistics in which Cornwall appears under such a very disadvantageous aspect, it is remarked "Lancashire and Staffordshire appear to have died out altogether, whilst other counties, especially those in the South (by which I presume Cornwall and Devonshire are meant), look as if they were going in the same road." As far as actual production is concerned the figures prove a great deduction, but from what I saw in Cornwall and Devonshire recently I conclude, so far from lead being exhausted in these counties, there is a grand field for developing lead on a very extensive scale. In both counties there is a vast territory of virgin and partially worked ground of a highly promising character. Permit me to give an instance or two. At St. Columb I visited a place where splendid lead had been struck at a few fathoms in depth in the neighbourhood of proved champion lodes, where at a small cost the place could be developed to profit even at present low prices. In Devonshire I visited another splendid mine, in which has been developed a lode hard and dry containing thousands of tons of lead within 100 yards of this locality. A company, I believe, of Scottish gentlemen, have since my visit struck a splendid lode. Another mine to the south was about being re-opened, and I was informed on very reliable authority that it also was one of great capabilities of production. In the mine in Devonshire I first visited the quantity of lead in the halvans appeared to be very great. Taking at random a little on a spade and washing it was surprising

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to see what a quantity of lead was in it. There is ample water-power for washing, so that any company taking such a royalty might make a fortune from the halvans alone, in which were about 23,000 cubic yards of stuff, and from a careful assay made were estimated to contain 1500 tons of lead, and an amount of silver which seemed almost too fabulous to specify.

Fearful as are the times, and still more fearful the various apprehensions of miners and speculators, yet we must not conclude that there is no silver lining to the dark cloud now enveloping our mining and other industries. I believe the cloud will pass over, and both capitalists and labourer will learn much wisdom from the past. All round we went more confidence and right feeling between capital and labour. One thought struck me when in the South what a splendid opportunity now presents itself to capitalists for buying lead and other royalties. Another year not only may we have reached the lowest point of depression, but a steady rise in prices may have set in, trade may and I believe will revive, and were capitalists will receive a fair remuneration for their investments, and labour will be adequately rewarded, as it is generally in prosperous times. The croakers over England's declension will have retired, and I trust to have a Rip Van Winkle sleep. Let every one banish gloom and apprehensions of greater disasters. Great storms are generally followed by genial weather, and let us hope and trust that the great crisis through which we are passing may be overruled for the permanent advantage and happiness of the whole country.—*Ulverston, Nov. 4.*

F. G. S.

THE CORNISH FELSPAR COMPANY.

SIR.—This company has only been a short time established, but notwithstanding this they have had several orders in, and they are now shipping at Fowey for Belgium 200 tons as a sample cargo. This house uses 3000 tons per year, and samples are sent into other houses that use the felspar very extensively, both in England and abroad. The company will, no doubt, do a very extensive business, and it is said that the shareholders will receive in dividends at least 50 per cent. The felspar is found close up to the surface, and 250,000 tons is now open and exposed to view, and the profits are over 10s. per ton. This must be a safe and profitable investment.

MINERAL INSPECTOR.

MINING IN NORTH WALES.

SIR.—I think the remarks by your North Wales Correspondent in last week's Journal as to "Daniels' Mine" ought to be contradicted. It is simply worked by a mining company, as many others are worked in this county, and not for the benefit of the "Daniels' family."—*Gwynedd, Nov. 4.*

ABSALEM FRANCIS.

PANT-Y-MWYN MINE.

SIR.—Messrs. Watson Brothers in their criticisms on this property, contained in their last week's article, state that their first acquaintance with and intimation of its existence was hearing the most extravagant reports as to its riches, and also of the introducing of the shares on the London market at 5*l.* per share. With regard to the former, we do not intend herein making any allusion, but flatter ourselves on being the introducers of this valuable and now noteworthy property into the London market. In reply to their latter observation, we would request them to refer to the Journal week by week from the issue of June 22 to that of Aug. 10 (eight weeks), when they will find we advertised these shares not at 5*l.* per share but at 3*l.*, 3*l.* 1*s.*, 3*d.*, 4*l.*, 3*l.* 1*s.*, 4*l.*, 4*l.*, and 4*l.* 10*s.* respectively. Surely during this period the advent of this property on our market must have become cognizant to Messrs. Watson, as also the above-mentioned prices; why, therefore, do they withhold these facts? If, on the other hand, they were ignorant thereof, we think they would do well to inform themselves fully on such points before committing their criticisms to print.

Bishopsgate, Nov. 7.

JONES AND HOUSTON.

PANT-Y-MWYN MINE.

SIR.—A man swearing that black is white would not change the colour, neither will Capt. Hughes, "Vincit Veritas," and others alter the effectiveness of the machinery in this mine by the assertions they make regarding them. When Capt. Hughes asserts to Messrs. Watson Brothers and their agent that the pumping-engine is a 9-horse power, working to 36-horse power, he displays the most consummate ignorance that can be conceived. When I was there this grand engine, which Capt. Hughes boasts so much about, was lifting about 45,000 lbs. per minute—that is less than 1*1/2*-horse power, with a steam pressure of 38 lbs. to the inch. Nothing, therefore, can be more evident than that this wonderful engine, with the present arrangement, cannot be worked to more than 3-horse power. Both Capt. Hughes and "Vincit Veritas" must be suffering from a mental jaundice or idiosyncrasy of the brain when they state that the machinery is sufficient for present purposes. If this be true, why did they stop the driving of the western end lest the water should drown the mine? And how is it that they have had so much trouble at times to keep the mine dry? "Vincit Veritas" would have your readers believe that this mine is so largely developed that the imaginative powers of Messrs. Watson Brothers' agent were incapable of grasping so comprehensive and complicated a system of operation. If this gentleman is honest in what he writes, and I have no reason to doubt, he shows clearly that he is the party labouring under an hallucination, and not Messrs. Watson Brothers' agent. The latter deals in facts and figures, but the former seems to rest on the baseless assertions of their so-called engineer, whose vision is dimmed and distorted by a sight of his own intellectual brightness. On the dressing department there is only one article that any sensible engineer would have at a gift, and that is one of Green's patent jiggers, which was being used for jiggling slimes. The pitwork is of the same rude description, and fit only to be thrown away. The good management of the mine has been, and is, boasted of. Do the directors know that the so-called stoping is digging here and there after the pockets of ore; sometimes driving, sometimes rising, sometimes sinking, and men all working on day work. Wonderful management! No wonder for Capt. Hughes to challenge any engineer to say that the mine is not properly developed when he sees a system so perfect. (?) It would be very interesting to know how the estimate of reserves is made out. Let anyone average the value of the lode for the whole distance that the levels are driven, and where will he find 2000 tons of lead discovered?—aye, where will he find 1000 tons? I wish, however, to say that I have never seen a little mine more promising in itself, and never saw one so badly used, and money squandered in such rubbishing clap-trap called machinery.—*Llanrwst, Nov. 5.*

JNO. ROBERTS.

PANT-Y-MWYN MINE.

SIR.—No doubt readers of your valuable Journal have observed from time to time most astounding and unfounded remarks made by Messrs. Watson Brothers respecting this valuable property. They say they would at all times rather praise than censure; but if they were deeply interested in our mine doubtless we would get a fair share of the former. We can all see that Messrs. Watson Brothers take great interest in obtaining information from parties connected, as they state, with this mine; and they inform us that to erect proper machinery to cope with the water (a sea of water as they call it) it would require about 30,000*l.* If that is the way Messrs. Watson Brothers employ 60 men to raise 60 tons of lead ore, at a cost of about 200*l.* per month. How long I raise ore, but when their Mr. W. H. Watson pays his visit to Wales (see *Hunting Journal*, Nov. 2, page 1204 and 1209) he had better beforehand call on or apply to our able secretary and obtain an order to inspect the mine. Then he may bear in mind that he will be talking to a man of 40 years practical experience, in which thousands of pounds have been spent, and I was a first visited him, and have a little within our reach. When we can get ore raised by miners at 12*l.* per ton, this encourages us to sink our shafts and drive levels to meet the large mass of ore which were once under water; and as we can have it stopped and enlightened Messrs. Watson Brothers how to work a mine with 50 men and raise 60 tons of ore at a cost of about 200*l.* per month, which I will prove when Mr. W. H. Watson pays us a visit to Wales. Allow me to state to the public that whoever informed Messrs. Watson Brothers

it would require 30,000*l.* to erect pumping machinery to cope with the water in our mine, and also that the mine is not worked in a proper manner, I most emphatically assert the informant can know very little about water pumping, as also about mining, notwithstanding his supposed great knowledge of the Pant-y-Mwyn and the district, and it is to be regretted he did not make use of his knowledge and take the mine before we did. In conclusion I beg to state that this mine is worked by sinking shafts, driving levels, opening out ore ground, and then stoping, and not running here and there after pockets of ore, as stated, and I challenge any experienced mining man to prove the contrary. As for pumping machinery 500*l.* would cover everything required, even should we come into Messrs. Watson's "sea of water," and our present engine will take us 20 yards deeper than we are now.

THOMAS HUGHES, Manager.

Nov. 4.

PANT-Y-MWYN MINE.

SIR.—I feel a degree of reluctance in again troubling you to insert a letter in reference to the above mine, but in last week's Journal having observed that Messrs. Watson Brothers in their circular were as industrious as ever in their endeavour to disparage the property and its management, notwithstanding the numerous letters that have appeared from time to time in its favour, elicited through their uncalled for criticisms. I was not a little surprised at their observation "that their object is, as it has ever been (?), to support legitimate mining." Such a remark is obvious in the case of Pant-y-Mwyn. I will not on this occasion encroach on your space by answering all their questions in detail (which are chiefly recapitulations of what they have already said), and I think have been in the main answered by other correspondents in your valuable Journal. With regard to the shares being introduced on the London market at 5*l.* per share in the first instance, I beg emphatically to contradict this, and refer Messrs. Watson Brothers to the number of the Journal of June 22, at which date they will find the shares advertised for sale at 3*l.*; and even at 5*l.* per share some consider them very cheap, as it may be remembered that only 10,500 shares have been issued, which would make the market value of the property represent upwards of 52,000*l.* The working expenses are a little over 200*l.* per month (as I have previously stated), and the present monthly returns of lead—60 tons—sufficient, I think, to show a profit of 500*l.* a month, or 6000*l.* per annum. I should, indeed, be pleased for Messrs. Watson Brothers sake to hear that the D'Eresby Mountain Mine (which I think they introduced to the public) could show such brilliant results. The shares on which 20*l.* was originally paid were, I believe, worked up to 100*l.* per share, representing 51,200*l.* for the whole property, which I do not think has up to the present time sold a single ton of ore, so that Messrs. Watson Brothers should bear in mind the old adage, "People who live in glass houses should not throw stones." It much against my inclination to have to make these observations, as I should be very sorry to wilfully depreciate the value of any mining property, but am only taking a leaf out of Messrs. Watson Brothers' book.

In reference to the leases, the letter of the secretary (Mr. E. Carver), which appeared in the *Mining Journal* of Oct. 26, page 1193, is to the effect that the company "have secured the lease on that portion of the seat [which they are now working, and is very extensive, and the draft lease for additional land was in possession.]

With regard to water springing out in the mine, the directors are quite alive to its probability, and now that an important discovery has been made at Modlyn Shaft I have been informed that they have contracted for a powerful engine to be erected forthwith though the present machinery is adequate for all present requirements (as previously stated), being from 8 to 9 horse power—not 5, as given out by Messrs. Watson Brothers in your Journal of the 5th ult., page 1192; and in order to corroborate my statements I append the following extract from a disinterested and private report, made on Oct. 17 by Captain Wm. Francis, whose truthfulness is too well known to need any comment:—

EXTRACTS.—"As this property is notoriously situated in one of the proved richest localities of the carboniferous limestone formation in the one of the proved property, contained in their last week's article, state that their first acquaintance with and intimation of its existence was hearing the most extravagant reports as to its riches, and also of the introducing of the shares on the London market at 5*l.* per share. With regard to the former, we do not intend herein making any allusion, but flatter ourselves on being the introducers of this valuable and now noteworthy property into the London market. In reply to their latter observation, we would request them to refer to the Journal week by week from the issue of June 22 to that of Aug. 10 (eight weeks), when they will find we advertised these shares not at 5*l.* per share but at 3*l.*, 3*l.* 1*s.*, 3*d.*, 4*l.*, 3*l.* 1*s.*, 4*l.*, 4*l.*, and 4*l.* 10*s.* respectively. Surely during this period the advent of this property on our market must have become cognizant to Messrs. Watson, as also the above-mentioned prices; why, therefore, do they withhold these facts? If, on the other hand, they were ignorant thereof, we think they would do well to inform themselves fully on such points before committing their criticisms to print.

Bishopsgate, Nov. 7.

JONES AND HOUSTON.

PANT-Y-MWYN MINE.

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JNO. ROBERTS.

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Nov. 4.

THOMAS HUGHES, Manager.

PANT-Y-MWYN MINE.

Meetings of Public Companies.

UNITED MEXICAN MINING COMPANY.

The ordinary half-yearly meeting of shareholders was held at the offices of the company, Great Winchester-street Buildings, on Wednesday.—MR. CHARLES MORRIS in the chair.

MR. W. H. BROWNE (the secretary) read the notice convening the meeting, and the minutes of the preceding meeting, which were confirmed. The report and accounts were taken as read.

THE CHAIRMAN said, before briefly referring to the report, he wished to tell the shareholders that Mr. Furber would have been present at the meeting if the state of his health would have allowed it. Mr. Furber, however, took just as much interest in the mine as he had ever done, and frequently called upon Mr. Browne, and the (Chairman) was authorised to say that if any shareholder had any question that he would like to ask Mr. Furber on any of the points in the working of the mine explained that gentleman would always be happy to attend to any appointment which might be made. In addressing the shareholders at their meetings he (the Chairman) always felt some degree of difficulty to know what to say to them, for the directors always made their report very full. This being the case he hoped the shareholders would excuse his not making a long speech. The substance of the report was contained in the paragraph, which stated:—

"The directors flatter themselves that though no decisive results can be claimed they are able to meet the proprietors under slightly improved prospects. Tradition (true at times, though generally fallacious) records that the mine of San Cayetano at the end of the last century was worked in good ore with profit to its owners, who were prevented from continuing downwards by the heavy influx of water. What has come to light in the mine points to the confirmation of this tradition. The water is very abundant, but will, after the communication of the pozos de agua, run down to the gallery of Los Angeles, and thence to the great adit, without trouble or expense. Again, the discovery of ore in various parts of the mine, and more so in solid ground in the pozos de agua (the latter having yielded 5*l.* 5*s.* per ton of ore, assaying from 200 to 280 ozs. of silver per ton) sufficiently proves that the old mine was really rich. The fact of the vein being entirely taken out from 80 metres depth up close to the surface corroborates this belief, and it is believed, with some degree of probability, that the cleaning up of the lower part of the mine (which, however, is an operation unfortunately involving delay and expense) will lay open new veins of the lode, both in the San Cayetano and El Diamante ground, which may be remuneratively worked on downwards to the level of Los Angeles, and subsequently to that of the great adit."

He could only call the attention of the shareholders to this, the most important paragraph in the report. It might be asked what reason the directors had for making this statement as to the prospects of the mine. Well, there was a tradition in the country that down to a certain point this mine was developed with a profit by the old workers, and the company had now very nearly reached the point at which they left off their explorations. The present indications were such as to warrant them in believing that they would soon get into ground the working of which would reward them for the courage and outlay that they had expended upon it. That was really the substance of the report, and he did not think he could tell the shareholders more if he talked to them for half-an-hour. Like other mines, this was, of course, a speculation, but he fully believed that they would soon be rewarded for their patience. He would be happy to reply to any questions which shareholders might wish to put, and would move—"That the report and London audited balance sheet as submitted be received and adopted."

MR. GOLDSMID seconded the motion.

A SHAREHOLDER asked whether the Chairman could inform them a little more definitely than "very nearly the point" how far they were from the point mentioned, and how long it would take them to meet it, because that seemed to be the crucial test?—THE CHAIRMAN replied that it would be utterly impossible to say how long they would be in reaching this point, as so much depended on the progress made in the cleaning up of the mine.

THE SHAREHOLDER said he referred more to the distance than the time.

THE CHAIRMAN had no doubt in two or three months time the shareholders would have a good deal more definite information as to the future prospects, but in the meantime they had good symptoms of ore.

The motion was then put, and carried unanimously.

MR. STAPLES thought the shareholders would go away rather dissatisfied with the very meagre report which had been presented to them. In this report the directors referred to traditions or certain history handed down as to what the mine had yielded in the way of profits to its previous owners. He thought the shareholders would be very much interested if the Chairman could give them a little more particulars as to this tradition; whether there was any definite history or anything to tell them that any particular family had made a large fortune out of the mine, or, in fact, anything at all which would be of service to this company or interesting to the shareholders to know. (Hear, hear.) He believed they were on the eve of very great success indeed, which probably the Chairman did not like to speak about, as he could not do so with actual certainty; but that was his opinion after watching the mine for a long series of years. They had more than a few stones of ore, for there were indications of veins which must have been worked at great cost, and have returned a considerable amount of profits to its then owners. Shareholders might not know why it was that the mine had not yielded a profit to the company before this time, but those gentlemen who were conversant with the progress of Mexican mining would know that it was only quite lately that any steam machinery had been employed in Mexico for the purpose of raising water from the mines, the drainage having been effected by the old means of malacates, or horse-whims.

The CHAIRMAN remarked that this company did not use steam to drain the mine.

MR. STAPLES said he was aware of that, for so far as he knew steam-pumping was only carried on at one mine in Mexico. He did not believe they would require to pump the mine for any length of time, for the deep adit level would keep it drained; but that point had not yet been reached. So far as they had seen the lode was of a porous character, and he believed the ore would continue down nearly to the top of the old tunnel itself. He wished to ask if the Chairman could tell them what was the distance from the present workings to the top of the tunnel, as that would give them an idea of the amount of reserves they were likely to have. He could only regret that Mr. Furber was not well enough to be present at the meeting, as he would, in all probability, have materially enlarged upon the remarks which the Chairman had made.

THE CHAIRMAN, in reply, said no one regretted more than himself the absence of Mr. Furber, but he might state the mine had been shut up until the present company commenced operations for a period of nearly 100 years, so that they could not expect to have any very accurate statement as to what it had yielded, more than a general tradition that it was very rich when the old workers were obliged to cease their operations. The appearance of the mine so far as they had gone fully justified them in hoping for very good results. Regarding the draining of the mine, the adit level to which Mr. Staples had referred would do it effectively.

A SHAREHOLDER said the old workers were probably drowned out.—THE CHAIRMAN had no doubt that was the case.

THE SHAREHOLDERS asked, if that were the case, whether it was not strange that with such a valuable source of profit their predecessors should not have made a fight against the water?

MR. WILLIAMSON (a director) replied that the old workers must have made a very considerable fight to have got to a greater depth than this company, with all the modern appliances of mining, had yet been able to reach. (Hear, hear.) Working a mine was a very different thing a hundred years ago to what it was now.

so that it would be about 100 metres to the top of the tunnel. Ore had been taken out to a depth of about 80 metres, but it had generally been found that the ore continued to depth of 350 metres; they had, therefore, a very large field before them in this district.

The meeting then terminated with a vote of thanks to the Chairman and directors.

WEST GODOLPHIN MINING COMPANY.

The general meeting of shareholders was held at the company's offices, Great St. Helens, on Tuesday,

Mr. ROBERT WILSON in the chair.

Mr. CHARLES THOMAS (the secretary) read the notice convening the meeting and the minutes of the preceding one, which were confirmed. The statement of accounts, showing a debit balance of 473/- 0s. 10d., was submitted, and the subjoined report of the agent was read:-

The CHAIRMAN was sorry to say that the last five months' working had resulted in a loss. They had cut the lode in the 80, but had not opened upon it as yet. As far as they had yet gone it scarcely paid for stamping, but in the shallower levels they had had to drive a little distance before reaching anything valuable. He hoped that in a few fathoms driving they would have a lode which for 10 ft. of its width was worth 40/- per fathom. For the next few months they would probably nearly meet cost, although their loss on the last five months' working was 577/- 11s. 1d., and the loss on the current month was 286/-; that loss, would, however, be somewhat lessened by the copper and tin they had on hand. They had had very little water in the early part of the month, but he hoped now that they had water that they would be able to increase their returns. After paying the cost now coming due they would have but 67/- at the bankers, whilst their arrears of call were 695/-, which was principally due from members of the committee.

Mr. C. THOMAS remarked that inasmuch as three-fourths of the mine were held by the committee, it necessarily followed that when they had large arrears of call the larger proportion of it would be due from the committee.

Mr. MASKELL enquired whether any shares had been relinquished? The SECRETARY said there had not; five shares had been forfeited some years since, and those still remained in the hands of the company.

The report and accounts were then, upon the proposition of the CHAIRMAN, seconded by Mr. GLADSTONE, received and adopted.

Mr. GLADSTONE enquired whether it would not be well to sell the engine which they were not using—not to force the sale, but by advertising it if necessary. He understood it was a good engine, although it was not powerful enough for them.—The SECRETARY feared that at present no reasonable offer would be obtained for it.

—Mr. GLADSTONE continued that as they had 3 tons of tin in the stone on hand, and had raised 12 tons last month, and might, with improving prospects, expect 14 tons this month, probably a very small call would suffice.

The SECRETARY said that if they raised 17 tons in the month the loss would be 100/- per month, so he did not see how they could do with a call of less than 2s. per share.

Upon the proposition of the CHAIRMAN, seconded by Mr. MASKELL, a call of 2s. per share, payable in 21 days, usual terms, was agreed to.

The CHAIRMAN read a letter from Mr. Waddington, who, he said, had recently purchased a large number of shares in the mine. It stated that Mr. Waddington had recently visited the mine, and made certain suggestions as to the points of working. He (the Chairman) thought Mr. Waddington would be a valuable member of the committee, and would propose his election.

Mr. MASKELL proposed, and Mr. C. THOMAS seconded, that Messrs. Wilson, Boulton, Gladstone, and Waddington be the committee for the ensuing four months.

Mr. MASKELL enquired what was to be done about the forfeited shares, and suggested that as the whole of the committee was present they should state what they intended to do about their arrears.

Mr. GLADSTONE said that for his part he had no intention of investing any more capital in the mine. Capt. Pope was, he fully believed, straightforward and honest, but his judgment had been continually in error. Instead of their position improving they were continually doing the reverse. Capt. Pope stated only in July that he hoped even at the present prices of metal to be able to meet cost, yet as a matter of fact they were now losing 10/- per day. At the 80 the lode was less valuable than at the 50; at the 70 it was poorer than at the 60, and at the 80 it would not pay to go to the stamps.

Mr. MASKELL enquired whether it was worth while to go on with the mine?

Mr. GLADSTONE thought that was the question, and he thought some independent agent should inspect the mine. He would suggest Capt. Josiah Thomas, not because he knew anything of him—he had never seen him but once—but because he had inspected it before.

The CHAIRMAN thought it undesirable that any inspection should be made until they had seen more of the lode at the 80, and as there was but one independent shareholder present he would ask him—Mr. Maskell—for his decision.

Mr. MASKELL was inclined to agree with the Chairman.

The meeting then degenerated into a desultory conversation between the gentlemen present, and ultimately closed in the usual manner.

CARON LEAD MINING COMPANY.

The first annual general meeting of shareholders was held at the offices of the company, Change-alley, on Monday,

Mr. W. BOWMAN in the chair.

Mr. HENRY R. MOORE (the secretary) read the notice calling the meeting.

The CHAIRMAN: Gentlemen, I think there is not much for me to say about the directors' report, and the same remark applies to the manager's report. They are simply statements of facts. I ought, perhaps, to apologise to you for the manager's non-attendance here to-day, but it was the judgment of your directors that he would be better employed at your works. We are just about getting our machinery into full work, and his services might be required there at any hour, and, therefore, we thought that the shareholders would dispense with his attendance here to-day. I shall be very glad to answer any questions which any shareholder may wish to put with regard to his report. I think it is very full and very satisfactory. The mine is opening up quite as well as we could expect. The 10 fm. level, so far as we have seen, is richer than the adit level, and the adit level is improving, and we have no doubt whatever that we shall have a profitable mine. The machinery is now all fixed, and we have taken care to do the work which had been done in a substantial manner. By making a new engine shaft, which we proposed to do from the beginning, we bring out our leadstuff considerably above the dressing-floors, so that in process of dressing the stuff has to come a little down hill. We raise it first of all into what we call the kilns, or ore-shoots, which hold a large amount of stuff; it will then from thence pass to the grates, for washing and picking, and then it will go from there to the crushing-mill, which is a little below, so it has not to be raised again. The loading places for the ore are a little elevated above the highway leading from the mine to the station. I may say that the road to the station is a very good one, so that the facilities for delivering the ore will be very good. I was rather hoping to have had a sample here for you to-day, and also an assay of it, but we were unable to get a really true sample, on account of our slime being behind. Perhaps I should explain more fully that the fine ore which comes out with the refuse in washing requires separating afterwards, and we have not a fair sample of that to mix with the other. It is to be mixed with the entire heap, and the sample taken from the whole, and if one could be got then we should have had a sample for you. I hope in a very few days we shall not only sample but also sell a considerable parcel. I have a letter from our manager, accompanying a sample of the first crushing which he sent up, but as it is not a fair sample I think it is not right to say anything further about it. The balance-sheet very much explains itself, but I shall be happy to answer any questions respecting it. In conclusion, the Chairman moved the adoption of the directors' and manager's reports,

and the statement of accounts.—Mr. BEDFORD seconded the resolution.

A SHAREHOLDER: What quantity of ore do you expect to sell as a first sampling?—The CHAIRMAN: We suppose that, at the first sale, we shall have 30 or 40 tons. We do not at present propose to sell such a large amount every month, unless it is the wish of the shareholders. Our idea is rather to limit our sales during the present dull times. We have opened up more ore ground, and we can set more stopes any day.

A SHAREHOLDER: What is your opinion about the price you are likely to get?—The CHAIRMAN: That is what I am entirely lost in. I believe the ore contains an appreciable amount of silver, and, therefore, I have been anxious for the last fortnight to get a proper sample, because a small percentage of silver may raise our price.

A SHAREHOLDER asked whether the discoveries in the 10 fm. level confirmed the hope of a continuous run of ore?—The CHAIRMAN said the course was not quite continuous. It was better in the 10 than in the adit level, and more uniform and bony as they got westward. In the 10 fm. level, and especially near the engine-shaft, they had had more ore than in any other part. It was there getting below the depth of the hill. He also believed the eastern portion would be very good.

The SHAREHOLDER: You are laying out in reserves more than you take away?—The CHAIRMAN: Yes; we are not taking away half the ore we could. We could take twice the ore we are doing.

The SHAREHOLDER: How many stopes have you at work?

The CHAIRMAN: Three, but one is a sort of development stope in the east, and that has proved better than we anticipated.

The SHAREHOLDER: What is the average value of the stopes?

The CHAIRMAN: About 10 or 12 cwt.s per fathom. We shall take down the poorer with the richer—perhaps, leave some of the richer. We have started a stope in the east, partly as a development, and it is turning out good ore.

The CHAIRMAN, in answer to a further question, said the run of ore was almost continuous for about 40 fms. Some parts were poor, and some richer, but the lode was uniformly productive so far as it had been opened. There was very little ground which would not pay for taking down.

A SHAREHOLDER: Do you call it a masterly lode?—The CHAIRMAN: Yes; it is very like the No. 3 lode in Grogwinion. The stratification is very much the same, and the indications similar. Indeed, you could not tell the heaps of ore-stuff at Caron from the Grogwinion ore-stuff.

The CHAIRMAN, in answer to a further question, said he hoped and anticipated that there would be an increase in the price of lead in the coming year.

The resolution for the adoption of the report and accounts was then put and carried.

On the motion of the CHAIRMAN, seconded by Mr. W. BROOKES, a resolution was passed authorising the calling up of the remainder of the capital.

The CHAIRMAN, in reply to Mr. Ross, said this would make all the shares level, and all would be equally entitled to participate in the dividend which the directors hoped shortly to pay.

On the motion of Mr. Ross, seconded by Mr. JOHN W. OWEN, Mr. Richard Ainlay was re-elected the auditor.

A cordial vote of thanks was then passed to the Chairman and directors, and the meeting broke up.

NORTH HENDRE LEAD MINING COMPANY.

The eighth annual ordinary general meeting of shareholders was held at the company's office, Westminster Buildings, Chester, on Monday.

Mr. HENRY R. BOWERS in the chair.

The SECRETARY read the notice convening the meeting, and the minutes of the last annual meeting and an extraordinary general meeting, both held on Jan. 25, were read and confirmed.

The annual reports and accounts having been sent to each shareholder were taken as read.

The CHAIRMAN, in moving their adoption, said that he was glad to meet the shareholders under such very favourable circumstances. He believed the mine had never before looked so well, and the company had never been so financially successful as last year, having made a clear profit of upwards of 12,000/-, and this would have been much larger but for the low price of lead during the year. The quantity of ore sold had been 1808 tons, and if the average price had been 2/- a ton more they would have been able to pay 12% in addition to the 40 per cent. now earned; the meeting would, therefore, agree with him that there was no reason to complain of the output or management. The engine and machinery having to be thoroughly repaired, the work of lead raising was partially stopped for nearly two months; if that had not been the case 200 tons more might have been raised during the year. He had been down the mine on Friday last, and Mssrs. Branley and Rowland on Saturday last, and had never seen the east level so well developed. The character of the ground was better and more promising than ever; in fact, there were large deposits of ore in sight. In the driving west of south the prospects are equally encouraging, although there is not so much ore in sight here as in the east level. With regard to the capital of the company, the shareholders would have observed by the report that the mortgage on the Hendrefield property had been paid off, and the directors had procured a first mortgage of 5000/- at 4 per cent. interest, leaving a balance of 7753/- 0s. 9d. due to the company. As they had to borrow about 3000/- out of revenue, this will at present interfere with the payment of the dividend; but the directors will consider the propriety of issuing additional shares to pay off the balance between the reserve of 4298/- and the 7753/- advanced on mortgage, and so set free the balance on revenue account. With regard to the purchase of the East Hendre sett, the legal documents necessary have been prepared, and when these have been signed this valuable property will be added to the North Hendre Mine. The directors would not have taken so much trouble to acquire the Great Hendre and East Hendre sets had it not been for the formation of the Halkyn Drainage Company, and he (the Chairman) thought this company ought to subscribe towards the capital of the Drainage Company, on the success of which so much benefit would accrue to this company.

Mr. WILLIAM ROWLAND said he was very glad to be able to verify the statements of the Chairman as to the improved appearance of the mine. He had never seen the different points in the east drivings looking so rich as at present. There were two points worth from 20 to 30 tons per fathom, the lead being in solid lumps of half a ton weight. As to the accounts, they speak for themselves, and although we are able to show a clear profit of 40 per cent. on the year's working this would have been considerably more if the price of lead had not been so low as it was. He had noticed reports in the Mining Journal asserting that the management of this mine was faulty, but he ventured to say that it would compare favourably with the management of any other lead mine, and he believed that the directors had fulfilled their duty well and faithfully, the result of which is shown in the published accounts: they will also show that the directors have not forgotten to write off a percentage of the capital expended on buildings and so forth, as gradually to wipe off these accounts.

The reports and accounts were then unanimously adopted.

The following resolutions were passed:—"That Messrs. H. R. Bowers, Urias, Bromley, and Wm. Rowland (the retiring directors) be re-elected." "That Mr. James Smith be re-appointed auditor." "That not exceeding 25 paid-up shares be placed at the disposal of the directors for the purpose of settling Mr. Thomas Jones' claim." "That 200/- be voted to the directors for their services during the ensuing year, exclusive of railway fares." "That a dividend of 10 per cent. on the paid-up capital be now declared, making 40 per cent. for the year, payable at a date to be fixed by the board." "That the warmth of the meeting be given to the directors for their valuable services during the past year."

Mr. SMITH, the solicitor of the Halkyn Drainage Company, attended to explain the present position of that company, and the necessity of obtaining further capital. He had taken a great deal of interest in the drainage scheme because he found that the Rhosneigr, Great Hendre, and other mines were utterly powerless owing to the water, which no machinery could cope with, and that nothing but the Deep Level would enable these mines to resume operations. He had, therefore, assisted in carrying through Parliament the Halkyn Drainage Bill. The capital subscribed was not sufficient to complete the work, they had already spent about 20,000/-, and wanted 15,000/- more. Out of 1330 yards the whole distance to be driven to the Pant-y-Go Mine, about 500 had already been driven. In the course of the operations a vein of lead ore had been struck, and they had commenced rising in the roof for the purpose of working the ore. At their last meeting the question of a further allotment of shares was brought forward, and about 1000 shares were taken, or were guaranteed by the present shareholders. The Great Hendre Mine, which would derive so much benefit from the successful working of the deep level, had never done anything towards assisting the Drainage Company, inasmuch as until now there had been no responsible owner or occupier of that mine, but now that the North Hendre Company had acquired the lease of the Great Hendre sett it is expected that the former will take shares in the Halkyn Drainage Company.

The CHAIRMAN said that he was of opinion that the North Hendre Company should in its own interests contribute to the capital of the Halkyn Drainage Company, and he would, therefore, recommend that shares to the amount of 2000/- should be applied for.

After several shareholders had requested further information upon different points, and were replied to by Mr. SMITH, it was resolved that this meeting approves of the company subscribing 2000/- to the capital of the Halkyn Drainage Company. Cordial votes of thanks were passed to the Chairman and the Secretary.

EAST POOL MINING COMPANY.

At a meeting of adventurers, held at the mine on Monday (Mr. R. R. BROAD in the chair), the accounts for 12 weeks, showing a profit of 1194/- 19s. 3d., were passed, and a dividend of 480/- (1s. 6d. per share) declared. The balance of 1194/- 19s. 3d. was directed to

be apportioned as follows:—480/- for the dividend; 688/- 12s. 6d. total amount of the debit balance; and 26/- 6s. 9d. carried to credit of next account. The following report was read to the meeting:—

Great Lode: The engine-shaft, sinking below the 190, is down 18 fms. We have finished cutting the bottom plat, and are now putting in the skip-road from the 180 to the 190; we shall fix a lift at the 190, and commence to sink as soon as possible. In the sump winze shaft we have fixed a lift at the 190, and are now sinking the shaft, which is down 3 fms. below the 190, and is worth for tin 18/- per fathom. The 190 is driven east from sump winze shaft 28 fms., and is worth for tin 18/- per fathom. In the 180 we have five stopes working, two east and three west, worth on an average for tin 14/- per fathom, each stope. The winze in the bottom of this level is communicated with the 190: we are now stowing east and west of this level. The 170, driving east on the south part of the great lode, is worth for tin 8/- per fathom; in the 170 we have a cross-cut driving south from the great lode, which is driven west from the 170, on the eastern ground, is worth for tin 9/- per fathom.

Engine Lode: The 170, west from engine-shaft, driving south on the cross-course, now sinks 10 fms.; here we think we have intersected the south lode, but shall know more about it in a few days.

Flat Lode: At the 150 we have three stopes working, worth on an average for tin 10/- per cubic fathom.

South Lode: The 160 is driven east from cross-cut about 51 fms., and is worth for tin and copper 10/- per fm. In the 150, east from western cross-course, we have two stopes working east and west of Woolcock's winze, worth for tin and copper 12/- per fm., each stope. In the 150, west from eastern cross-course, we have two stopes working—one in back and one in bottom, worth for tin and copper 9/- per fm. The 140, west from the eastern cross-course, is driven west from Craven's winze about 9½ fms., and is worth for tin and copper 13/- per fm.; we have one stope in the back of this level worth for tin and copper 12/- per fm.

Western Shaft: We have secured and cut down this shaft to about 20 fms. below the adit, or about 40 fms. from surface, and have also put in the ladder road from surface to the 18. We have eight tribute pitches working at tributes varying from 10s. to 13s. 4d. in 17, on tin and copper. —JOHN MAYNARD, Manager; C. BISHOP, W. TIPPETT, Agents.

WEST PATELEY BRIDGE LEAD MINES.

The report of the directors, to be submitted at the meeting on Tuesday, states—

The expenditure during the year embraced in the accounts amounted to the sum of 3525/- 15s. 10d., for which a large amount of dead work has been done—a Robey's patent steam-engine erected, with drums and machinery, for working both the No. 2 and Craven Cross shafts, a crusher and dressing floors erected, tramways laid, reservoirs constructed, and other surface operations completed on a scale equal to the treatment of a large quantity of lead ore. The large amount of sinking and underground work done during the year is fully explained by the manager's report of June 18 and that now submitted; the latter so clearly states the present position and prospects of the undertaking that the directors feel it unnecessary to supplement it by any remarks of their own. The unexpended capital amounts to a total of 9118/- 15s. available for future operations. The directors retiring at this meeting are Col. A. Todd and Mr. H. A. Hammond, who, being eligible, offer themselves for re-election.

The manager's report (Mr. David Williams, M.E.) is as follows:—

Craven Cross Shafts: The north shaft is sunk, cased, and divided, and a substantial ladder road put in to a depth of 52 fms. below surface, and communicated with the top level, and will be carried down to the same depth as the 56; before reaching that point the main part of the vein will underlie into the shaft, and judging from the large quantities of ore raised from the workings above, and the character of the vein at this depth, our prospects here are most flattering.

56 Fm. Level: This level is extended west upon Craven Cross vein 128 fms., and is now within 26 fms. of being under the perpendicular of the shaft. The vein in the present end is very promising, being over 4 ft. wide, composed of spar, barytes, and branches of galena of good quality, the richest ore going down in the sole of the shaft, after which we shall cross-cut north and south to the parallel veins. Those on the north being in entirely whole ground have all proved rich in the adjoining mine, whereas those on the south have produced more or less ore in this sett. From a small shaft upon Longthorn's vein a few miners raised about 12,000/- worth of ore in a very short time. At a point 48 fms. east of Craven Cross shaft we have sunk a winze for a 63 fm. level; the latter is extended west upon the vein 12 fms. The vein in the present end is over 18 in. wide, and worth for lead ore 5 cwt.s per fathom; a stope in back of same level in a vein 4 ft. wide, producing 5 cwt.s of ore per fathom.

No. 2 Shaft: The 20, east of shaft, has been extended 61 fms. 3 ft. upon the vein; the latter is 3 ft. wide; its component parts consist of spar, barytes, and intermixed with branches and patches of lead ore. A stope in back of level is

Upper Hornsey Rise; B. T. Norton, Twickenham; S. Cartwright, Guildhall Chambers; W. H. Pannell, Putney; E. P. Wilson, 11, Old Jewry Chambers.

FAVERSHAM BRICKFIELDS COMPANY (Limited).—Capital 20,000*l.*, in shares of 5*l.* For the immediate acquisition of the estate, right, title, and interest of J. S. Maughan in the Uplees Brickfields. The subscribers (who take one share each) are—T. Grover, Bridge-Marsh; J. S. Maughan, Turnham Green; S. Husband, London; T. Jervis, 3, King-street; T. Lund, 24, Martin's-lane; J. Kellow, 44, Baker-street; P. Lowrey, 28, Bridge-street.

ALBERT BUILDINGS COMPANY (Limited).—Capital 20,000*l.*, in shares of 5*l.* The acquisition of the land, buildings, &c., in or near to Horton-road, Bradford, Yorkshire, and the laying out, parcelling and improving, selling, mortgaging, and leasing same. The subscribers (who take 20 shares each) are—R. Moore, Bradford; J. W. Greaves, Bradford; G. Hetherington, Bradford; S. Wharton, Bradford; S. Hewitt, Bradford; A. Wood, Bradford; W. Moulson, Bradford.

THE SOUTH AMERICAN GOLD COMPANY (Limited).—Capital 2400*l.*, in shares of 100*l.* To acquire any mines and minerals in South America, to trade generally there, and to acquire, construct, or hire any plant, machinery, to prospect for mines and minerals, and to carry on the business of miners. To apply for and obtain concessions from the Government of Venezuela or other Governments for the purpose of carrying out the above object. The subscribers (who take one share each) are—E. Cozens Smith, Enfield, manager of a public company; W. S. Ellis, 2, Royal Exchange Buildings, stock broker; J. A. Hallett, 7, St. Martin's-place, banker; C. Smith, Muswell Hill, secretary; H. B. Muir, 26, Old Broad-street, merchant; W. B. Barbour, 196, Haverstock Hill, gentleman; R. Hewett, Barking, managing director of Hewett and Co. (Limited).

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week markets have been quiet, and, although prices are in most cases again lower, a tendency to recover is now apparent. This may only be the natural reaction from the serious fall that has taken place, but some improvement might easily be established, for many good stocks are quoted at very low prices, thus presenting opportunities to investors such as very seldom occur. The easier tendency of the money market is a favourable feature, but a general improvement cannot be looked for until confidence is much improved, our foreign relations more pacific, and trade reviving.

In shares of coal and iron companies, the movements are all downward. Bolckow, Vaughan, A, Cafreton, and Ebbw Vale are each 10*s.* lower, Benhar 4*s.*, and Scottish Australian 2*s.* 6*d.* The principal business has again been in Benhars, which commenced at 50*s.* and improved to 62*s.* 6*d.* but a downward tendency has since set in, and they again stand at 50*s.* It is pointed out as a strange anomaly that while other coal companies are making little or no profits, and many of them being wound up, the Chapel House still keeps before the public with a profit of 2*s.* per ton, and yet pays no dividend. Ashton Vale are at 5*s.* Andrew Knowles and Sons (25*s.* paid), 8*s.* 6*d.*; ditto (20*s.* paid) 7*s.* Bolckow, Vaughan, A, 53*s.* ditto, B, 53*s.* Bowling, 52*s.* Cardiff and Swansea, 22*s.* 6*d.* Carnforth, 59*s.* Charles Cammell and Company, 12*s.* Chillington, 55*s.* to 60*s.* Consett, 17*s.* Ebbw Vale, 54*s.* Great Western, 40*s.*; ditto (pref.), 58*s.*; ditto (debentures), 6*s.* Henry Briggs, A, 12*s.* Newport Abercarn, 8*s.* Rhymney, 14*s.* Sheepbridge, 30*s.* South Wales, 70*s.* Staveley, A, 70*s.* prem; ditto, C, 65*s.* Ulverston, 8*s.* West Morecambe, 9*s.* In shares of foreign copper and lead companies, Tharsis are reduced 16*s.* 3*d.* ditto (new) 12*s.* 6*d.* and Cape 10*s.* Tharsis have fluctuated from 20*s.* 12*s.* 6*d.* to 19*s.* 13*s.* 9*d.* It is understood the prospects of Panucillo Company point to a more profitable future, as the appearance of the property is satisfactory, while the economies introduced into the management have already succeeded in reducing the losses. English and Australian are at 20*s.* Cape, 28*s.* Fortuna, 80*s.* Rio Tinto 5*s.* per cent., 60*s.* Yorke Peninsula, 5*s.* 6*d.*; ditto (pref.), 12*s.* 6*d.* Little doing in shares of home mines. Glasgow Cardron are firm. The next sale by this company is computed 225 tons copper ore, which will compare with 20*t.* tons last month, and 195 tons in November, 1877, but for the four preceding years the November sale was always 240 to 250 tons. Lead companies' shares are still weak, and Roman Gravels are expected to be lower. Bampfylde are at 1*s.* Bodmin, 3*s.* Devon Consols, 3*s.* to 1*s.* Great Laxey, 14*s.* to 14*s.* North Loxey, 2*s.* Pandora, 3*s.* Paracomb, 3*s.*; St. Patrick, 3*s.* South Roman Gravels, 3*s.* West Tankerville, 2*s.*

In shares of gold and silver mines, Richmond are 5*s.* higher, and have been steady all the week. A meeting of this company is to be held next Wednesday, to receive Mr. Probert's reply to the late Committee of Investigation, and transact other business. Last year's run was the most successful in the history of the company, and the shareholders received 3*s.* 2*s.* 6*d.* of dividends on each 5*s.* share. Operations are to be resumed in December, when the appearance of the mine indicates equal success will be attained. The action by the Eureka is postponed until the spring. The present price of the shares includes a dividend of 10*s.* payable to day. The dividend of the St. John del Rey is not expected to exceed 30 per cent. for the past half-year. Almaden and Trito have a loss of \$1500 on September. The result of the final clean-up for this season at Birdseye Creek is a gross return of \$16,500. Australian mines shares keep steady. Chicago are at 1*s.* Colorado, 3*s.* Eberhard, 3*s.*; Emma, 2*s.*; Exchequer, 2*s.* 9*d.* to 6*s.* 3*d.*; Flaggstaff, 3*s.* Frontino, 2*s.*; IXL, 1*s.* to 1*s.*; Javall, 6*s.* to 8*s.*; Santa Barbara, 27*s.* 6*d.* to 32*s.* 6*d.*; South Aurora, 1*s.* to 1*s.*; Tecoma, 3*s.* to 3*s.*; United Mexican, 3*s.*

In shares of oil companies Young's Paraffin are 7*s.* 6*d.* and Uphill 5*s.*, both lower. Young's Paraffin gradually declined from 13*s.* to 12*s.*, but are now firmer. Runcorn Soap and Alkali, 7*s.* 6*d.* Shares of miscellaneous companies are unaltered, except a fall of 5*s.* on Phospho Guano, at 8*s.* Avonside Engines are at 6*s.* 6*d.* Hopkins, Gilkes, and Co., 10*s.* 6*d.*, and Palmer's Shipbuilding (B) 13*s.* Price of wagon companies shares are—Birmingham, 1*s.*; Bristol and South Wales, 7*s.* 6*d.*; British, 20*s.*; Gloucester, 9*s.*; Lancaster, 15*s.*; Metropolitan, 40*s.* prem.; Midland, 13*s.*; Swansea, 7*s.* 6*d.*; Wakefield, 23*s.* 6*d.*; Western, 70*s.*; and Yorkshire, 13*s.* Prices of chemical companies shares are—Langdale's, 8*s.* to 8*s.* 6*d.*; Lawes, 8*s.* to 8*s.* and Newcastle, 4*s.* 9*d.*

The following calculations show the yield per cent. on the money invested at present prices in the shares named, based upon the last average yearly dividends being maintained.—In coal and iron companies Arniston would yield 7*s.* 6*d.* Benhar 5*s.* Bolckow, Vaughan (A), 5*s.* Cairnla 12*s.* and Muntz's Metal 7*s.* In oil companies Dalmeny would yield 12*s.* Oakbank 17*s.* ditto (new) 6*s.* 6*d.* Price's Patent Candle 7*s.* Uphill 3*s.* 6*d.* Tharsis Sulphur and Copper 8*s.* 6*d.* ditto (new) 9*s.* United States Rolling Stock 4*s.* and Val de Travers Asphalte Paving 6*s.*

SILVER-LEAD MINING.—A good mining sett, situated in the richest district in Cornwall, is in treaty to be sold to a company formed to work it more extensively. An adit cross-cut has been driven 38 fms., and the lode intersected is 5 ft. wide, composed of great rocks of gossan, friable spar, muriatic, and silver-lead. An air-shaft has been sunk to communicate with the adit level, and the present end is about 4 fms. in advance of the shaft. The hill rises about 3 ft. in a fathom. Every course of the lode backs of 30 to 40 fms. would be gained quickly. The sett is an extensive mine, and a good stream of water for pumping and dressing purposes runs through it. The royalty is 1-20th. The property will be transferred to the company which will be such as to ensure every confidence, and the results of the developments cannot fail to be a great success to the adventurers.

FIFE COAL COMPANY (Limited).—This company is carrying out extensive operations at Leven, Fife. They are sinking two of the largest shafts in Scotland, which will be worked on the double cage system. No. 1 pit is 15 ft. by 9 ft., and the other is 19 ft. by 10 ft. The seam pole sunk to is the main splint lying at a depth of 150 fms. One of the largest pump engines in Scotland has been erected at one of the pits capable of raising 500 tons each daily have been erected on the pits. For the shipment of their coals wet docks are being constructed at Leven harbour at a cost of £30,000, and for those going by rail a short line is being laid from the pits direct to the North British Railway.

MUNDIC MINES.—The electric light invention affords a prospect of better times for the Cornish pyrites or sulphur-mundic mines. If the light comes into general use it is calculated that sulphuric acid will be greatly required in the process. Consequently the price of this acid will be much enhanced, as well as the ore from which it is made. Such of the mines as have large quantities of the mundic may, therefore, make a greater or less addition to their revenue by erecting sulphuric acid works.

MINING IN SCOTLAND.—In the beginning of the 17th century an important find of silver ore was made at Hilderstone, near Linlithgow, and under the management of the captain at Leadhills and Saxon miners; it gave great promise, but ultimately the ore turned out to be so poor that working was abandoned till this day, though proposals have occasionally been made to give it another trial. During the 16th century working for gold was carried on at Leadhills, and all that did not have weighed 27*oz.* The reputation of Scotland as a gold-bearing country is quite evident what fortune would attend operations on a larger scale. Copper mining has never been remunerative for a time, but now it is almost extinct. Lead mining, uninterrupted to the adventurers, yet it has been prospected, of course, been made in Scotland by mining, but it is entirely due to coal mining, and investors should bear this in mind. These are the only minerals which have proved reliable for great and permanent profitableness, and whatever may have in the past only proved sources of losses and disappointment.

WESTERN ANDES MINING COMPANY.—This company used to pay

large dividends, but for some time has been under a cloud, owing to two causes. First, civil war broke out in Columbia, and the miners were seized for soldiers, bringing operations practically to a standstill. In the next place, great drought prevailed for months, and as the mines are dependent on water supply this occasioned further loss. Now, however, the war has been terminated and the supply of water improved, so the profits should decidedly increase.

GLASGOW PORT WASHINGTON COAL AND IRON COMPANY (Limited).—The report to be submitted to the meeting of this company, to-day, after referring to the continued depression in the iron trade, states that an important discovery of a seam of coal has been made in their property. It has been opened on in two places, and is believed to extend through a great part of the estate. The coal has been analysed, and the directors hope to use it in the manufacture of pig-iron, and thereby reduce the cost of production.

Capital. Dividends. Rate per cent. per annum. Description of shares.

| Per share | Paid up | Previous | Last | COAL, IRON, STEEL. | price. |
|-----------|--------------|--------------------------|--------------------------|--|--------------------------|
| £ 10 | £ 2 | £ 2 | £ 7 | Arlinston Coal (Limited) | 7 <i>s.</i> 6 <i>d.</i> |
| 10 | 10 | 4 | 4 | Benhar Coal (Limited) | 50 <i>s.</i> |
| 100 | 50 | 22 <i>s.</i> 6 <i>d.</i> | 31 <i>s.</i> 6 <i>d.</i> | Bolckow, Vaughan, and Co. (Lim.) | 5 <i>s.</i> |
| 10 | 10 | 10 | 10 | Cairntarne Gas Coal (Limited) | 7 <i>s.</i> 6 <i>d.</i> |
| 10 | 10 | 4 <i>s.</i> | 4 <i>s.</i> | Chillington Iron (Limited) | 60 <i>s.</i> |
| 10 | 7 | — | — | Clyde Coal (Limited) | 7 <i>s.</i> 6 <i>d.</i> |
| 28 | 20 | 10 <i>s.</i> | 10 <i>s.</i> | Ebbw Vale Steel, Iron, and Coal (Lim.) | 7 <i>s.</i> 6 <i>d.</i> |
| 10 | 6 | nil | nil | Fife Coal (Limited) | 7 <i>s.</i> 6 <i>d.</i> |
| 10 | 10 | nil | nil | Glasgow Port Washington Iron & Coal (L.) | 38 <i>s.</i> 3 <i>d.</i> |
| 10 | 10 | — | — | Ditto Prepaid | 40 <i>s.</i> |
| 10 | 10 | — | — | Ditto Capelhead (Limited) | 60 <i>s.</i> |
| 10 | 10 | nil | 3 | Marbleba Iron Ore (Limited) | 37 <i>s.</i> 6 <i>d.</i> |
| 10 | 10 | nil | nil | Monkland Iron and Coal (Limited) | 30 <i>s.</i> |
| 100 | 100 | nil | nil | Nant-y-Glo & Blaina Ironworks pref. (L.) | 20 <i>s.</i> |
| 6 | 6 | nil | nil | Omoa and Cleland Iron & Coal (L. & Red.) | 7 <i>s.</i> 6 <i>d.</i> |
| 1 | 1 | 15 | 15 | Scottish Australian Mining (Limited) | 32 <i>s.</i> 6 <i>d.</i> |
| 1 | 10 <i>s.</i> | 15 | 15 | Ditto New | 15 <i>s.</i> |
| Stock | 100 | nil | nil | Shotts Iron | 80 <i>s.</i> |

| COPPER, SULPHUR, TIN. | | | | | |
|-----------------------|--------------|-------------------------|--------------------------|---|--------------------------|
| 4 | 4 | — | — | Canadian Copper and Sulphur (Lim.) | 5 <i>s.</i> |
| 10 | 7 | 7 <i>s.</i> 6 <i>d.</i> | 35 <i>s.</i> 6 <i>d.</i> | Cape Copper (Limited) | 28 <i>s.</i> |
| 1 | 1 | 7 <i>s.</i> | 2 <i>s.</i> | Glasgow Cardron Copper Mining (Lim.) | 20 <i>s.</i> |
| 1 | 15 <i>s.</i> | 7 <i>s.</i> | 2 <i>s.</i> | Ditto New | 13 <i>s.</i> 6 <i>d.</i> |
| 10 | 9 <i>s.</i> | nil | nil | Huntington Copper and Sulphur (Lim.) | 10 <i>s.</i> |
| 4 | 4 | — | — | Panucillo Copper (Limited) | 20 <i>s.</i> |
| 10 | 10 | 8 <i>s.</i> | 8 <i>s.</i> | Rio Tinto (Limited) | 60 <i>s.</i> |
| 20 | 20 | 7 | 7 | Ditto, 7 per cent. Mortgage Bonds | 1 <i>s.</i> 3 <i>d.</i> |
| 100 | 100 | 5 | 5 | Do. 5 <i>s.</i> p.m. Deb. (Sp.C. Bds.) | 61 <i>s.</i> |
| 10 | 10 | 22 <i>s.</i> | 20 | Tharsis Copper and Sulphur (Limited) | 19 <i>s.</i> 1 <i>d.</i> |
| 10 | 7 | 22 <i>s.</i> | 20 | Ditto New | 12 <i>s.</i> 6 <i>d.</i> |
| 1 | 1 | — | — | Yorke Peninsula Mining (Limited) | 5 <i>s.</i> |
| 1 | 1 | — | — | Ditto, 15 per cent. Guaranteed Pref. (L.) | 17 <i>s.</i> 6 <i>d.</i> |

| GOLD, SILVER. | | | | | |
|---------------|-------------|-------------------------|-------------------------|---|--------------------------|
| 1 | 1 | — | — | Australian Mines Investment (Limited) | 8 <i>s.</i> |
| 5 | 5 | 7 <i>s.</i> 6 <i>d.</i> | 7 <i>s.</i> 6 <i>d.</i> | Richmond Mining (Limited) | 10 <i>s.</i> |
| | | | | OIL. | |
| 10 | 7 | 6 | 15 | Dalmeny Oil (Limited) | 8 <i>s.</i> |
| 1 | 1 | 7 <i>s.</i> | 25 | Oakbank Oil (Limited) | 40 <i>s.</i> |
| | 5 <i>s.</i> | 25 | 25 | Ditto | 11 <i>s.</i> |
| 10 | 10 | 7 <i>s.</i> | 2 | Uphall Mineral Oil (Limited) "A" | 5 <i>s.</i> |
| 10 | 10 | — | — | Ditto "B" Deferred | 10 <i>s.</i> |
| 10 | 8 <i>s.</i> | 17 <i>s.</i> | 20 | West Calder Oil (Limited) | 15 <i>s.</i> |
| | | | | Young's Paraffin Light & Mineral Oil (L.) | 12 <i>s.</i> 6 <i>d.</i> |

* Interim. Per share. * For six months of 1878.

Note.—The above lists of mines and auxiliary associations are as full as can be ascertained, Scotch companies only being inserted, or those in which Scotch interests are interested. In the event of any being omitted, and parties desiring a quotation for them and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

J. GRANT MACLEAN, Stock and Share Broker.

Post Office Buildings, Stirling, November 7.

LARGE CAPE DIAMONDS.—Diamond digging at the Dutoitspan fields has been unusually successful of late, and besides several beautiful stones of 50 carats each, a large diamond, weighing 244 carats, was recently picked up on a claim belonging to a Captain Jones. The "water" of the stone is not of the first quality, being of a light "off-colour," but the gem is free from flaws, and will cut very full. This is the second largest diamond ever found in South Africa, the "Spalding" diamond, found in the river diggings some years ago, and weighing 288*s.* carats, being the largest.

Aug. 30: Our operations at Clemes' cross-cut have not been so satisfactory as we had hoped. The quartz we come in contact with must either be a big rock or some deranged part of the lode. Had the cross-cut been further south it is probable the lode would have been found in a more settled state. In that case it would have been away from the bend and the broken state of the lode. This large quartz lode should be fairly and faithfully explored, as it may become the salvation of the mine. In our general report the merits of this lode will be fully set forth.

Sept. 6: The lode in the end south of this place appears to be better defined than when last reported on; it consists of a hard, poor-looking quartz. Any change must be for the better.

Sept. 13: In the level driving south of Clemes' cross-cut the lode is 5 ft. wide, compact, and well defined, consisting of hard quartz and spots of black ore. There is a little water coming out of the lode.

Sept. 20: The level driving south on this lode does not improve; it is less defined than it was, and mixed with country rock. If no change takes place shortly in driving on the course of the lode south of Clemes' cross-cut we intend to clear at surface down to the old workers' bottom; this lode being for a considerable distance in whole ground, and a great height above the tunnel level, would be of immense importance if ore ground in paying quantities could be found; still we can but admit that our prospect in the present end is anything but favourable. Should any change take place it must be for the better.

Sept. 26: No improvement has taken place at this point.

CHEZ VENDE.—Aug. 22: No change has taken place worthy of notice; it is yielding as usual, a little green ore. We intend to put on an increase of force at this point in the course of a few days, in order to ascertain whether the ore goes into near surface and the old workings, but little dependence can be placed on its durability.

Sept. 6: The end has fallen off in value, but the back is productive of good ore; this is now set on tribute.

Sept. 13: There is no change to speak of.

Sept. 20: A fair quantity of green ore is being broken from this point. The end driving north towards Díos Padre is very poor, and will not pay the expense of driving. We shall begin some little exploratory work here shortly.

Sept. 27: The stope in the back yields a fair quantity of green ore. The end going north has a little more ore than when last reported on; our bearing is so shallow and near the old workings does not lead us to hope for great things here so near the surface.

J. H. Clemes, Aug. 30: Underground: The expense we are now incurring in the Mina Grande will not permit of our doing anything at present in the bottom of the Trito. To keep the furnaces supplied with black ores the present expenditure in the Mina Grande will increase rather than diminish. The operations going on in that mine are the stopes between the tunnel and the 12 and the communication from the 12 to the 15; the ground is hard and expensive to work. From the latter place water has to be drawn by hand. The ley of the ores from this mine is slightly higher than usual.

VETA DE LAS GUILAS.—Clemes' Cross-Cut: A resolute attempt to see this fine lode at tunnel level should be made.

Sept. 13: ASSAYS: Sample from incline winze below the 12, Mina Grande, general sample from $\frac{1}{2}$ ton of spalled best work—80-94 ozs.; in consequence of this sample I to-day telegraph you—"Ley in Mina Grande bottom improved." Sample (fresh one) of buckle head from Mina Grande burrows (repeated)—45-41 ozs.; this sample is important, but until more is stamped from these burrows do I feel safe in telegraphing.

Sept. 20: We find that the ley in the Mina Grande has improved. We last week sent you the result of a good general sample in the 12 winze, and are now preparing another from the 15 (from previous samples that I have had from the latter this may, I think, be called 23rd rock). I had always looked upon these ores on account of their leadiness as like the other Mina Grande ores, poor.

Sept. 27: ASSAYS: General sample from pile of spalled ore workings in the 15, Mina Grande, 133-44 ozs.: smalls for furnace, from Mina Grande dump, 29-84 ozs.; ditto, 36-95 ozs. Mina Grande spalled ores of ley 0-4575 per cent., is something new here, and still further justifies my telegram of the other day. These are not assays of picked stones, but general samples taken by Capt. Morecom. I have ordered the separation of the solid ore from this place for export.

Cross-Cut to Las Guijas, or Clemes' Cross-cut: This lode is not at all well defined, and if at the end of next week the end does not look more inviting I shall follow Capt. Morecom's advice, and begin to sink at surface. Explorations in the Trito bottom will be begun as soon as possible.

Telegram from Mr. Clemes—Loss for September, \$1500.

ON FORCE PUMPS WITH TUBULAR RODS.*

The author describes various arrangements of pumps for mining purposes, in which the delivery-pipe, or a portion of it, is used as a pump-rod, and he discusses and compares their merits and demerits from a theoretical and practical point of view. He states the formulae for determining the principal dimensions, weight, &c., for various constructions. Preference is given to Rittinger's pump, as being the cheapest, most economical in working, and taking up the least room in the shaft. In Rittinger's pump the lower end of the delivery-pipe acts as the plunger, in the interior of which the delivery valve is placed; the uppermost portion, from which the overflow takes place, is rigid, and fits into a stuffing-box at the end of the movable part forming the pump-rod. Another modification is also described by the author. The firm of Hoppe, in Berlin, has for many years made pumps of the above description, from 1000-horse power downwards, for various mines in Germany, some of which are named by the author. For driving these pumps compound rotative engines with fly-wheels are considered the best, Cornish engines having been found to be unsuitable. According to Hoppe's experience, this kind of pump does not work advantageously when the quantity of water to be raised amounts to less than the fourth part of that for which it is designed.

* By Prof. H. UNDEUTSCH: Civilingenieur.

* From JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

PREVENTING INCRUSTATION OF BOILERS.—The improvements invented by Mr. F. JANSEN, of Herten, Holland, consists in the manufacture and use of a material which the inventor calls "alcalised cellulose," and which is made in a fluid as well as in a solid state by boiling by steam suitable fibrous materials or their derivatives with lye of soda, to which in some cases oxalic acid may be added. A certain quantity of the "alcalised cellulose," say half a pint per week and per HP, fed in the boiler with the feed water will be sufficient to keep the boiler clean of incrustation and free from corrosion. The composition acts thus:—The matters forming incrustation are precipitated in form of a fine powder or mud, and gather at the bottom of the boiler, whence they can be let out or withdrawn after some time of rest through the waste cock; but as the accumulation of sediment in the boiler with very hard and impure feed water would be very great, and this, as well as the clearing it out from the boiler, would be connected with much trouble and other drawbacks, he employs a special apparatus for the automatic removal from the boiler of the injurious matters which have been precipitated by the use of the alcalised cellulose, and he claims that in combining the two he radically prevents the formation of incrustation in steam-boilers.

NEW WATER MOTOR ENGINE.—In connection with engines whose motive power is produced by the pressure of a fluid such as water, steam, or air, Mr. F. W. TURNER, of St. Albans, has invented some improvements, which include various novel features of construction. According to one part of his invention he constructs an engine which is chiefly designed to utilise the force of a head of water. This engine is provided with an oscillating cylinder containing a piston, the rod of which is coupled to and actuates a crank shaft. A fly wheel is necessary where a single cylinder is used. One important feature of this part of the said invention is the arrangement of the centre of oscillation of the trunnions at or near the upper or crank end of the cylinder instead of in the centre of the cylinder's length, as heretofore, in such engines. Another feature of this part of the invention is the peculiar construction of the trunnion through which the fluid is admitted to and exhausted from the said cylinder. The trunnion is made in the form of a conical socket, which is fitted and works to and fro on a hollow conical or taper plug, secured in any suitable manner to the framing, and which forms the valve for regulating the admission and exhaust of the fluid to and from the cylinder. Through the shell of this conical part or plug he forms two ports or apertures (when the cylinder is vertical) at the upper side, and two at the lower side of the same leading into two separate compartments formed in the said conical plug. These compartments are separated from each other by a partition or diaphragm extending throughout the length of the said plug. One compartment and port form the admission passage and the other the exhaust passage for the fluid. Instead of being at the top and bottom it is obvious that these ports may be otherwise arranged, but the admission and exhaust ports must in all cases be separated from each other. In the face of the cylinder trunnion at the parts which work over these ports or apertures he provides other apertures or ports leading to the two ends of the cylinder, and by the oscillation of the said cylinder these ports in the trunnion are moved to and fro over the said admission and exhaust ports, and the partition or diaphragm in the

conical plug, thereby alternately admitting and exhausting the fluid at both ends of the cylinder. The motor above described can also be worked by steam or compressed air. Outside of the said trunnion the plug or trunnion bearing has a cylindrical portion, which passes through a gland packed with asbestos, or other suitable material. Between this gland and the aforesaid ports Mr. TURNER turns in and around the interior of the trunnion a small groove or channel, from which longitudinal grooves extend into a space left for clearance at the inner end of the said plug or valve, and he forms a small hole through the end of the valve plug on the exhaust side of the said diaphragm, reaching into the exhaust compartment, the object being to provide means for the escape into the exhaust passages of any water that may leak past the valve. The other trunnion of the cylinder in the improved engine works on a plain cylindrical journal or bearing, which is supported on the engine framing, and is made adjustable endwise. By means of this adjustable bearing the conical trunnion of the said cylinder may be forced more or less tightly upon its conical valve or plug, and the wear or slack of these parts may thus be compensated or taken up.

CONVERSION OF NON-CHILLING IRON INTO CHILLING IRON.

An improved method of converting non-chilling into chilling irons has been invented by Mr. S. A. FORD, of Allegheny, Pennsylvania, and consists in submitting a charge of melted non-chilling iron to the action of an air blast for a few minutes only (say, from one to six minutes), the air-blast being cut off either just before or just after the appearance of the carbon flame, according to the depth of chill required in the product. In the manufacture of pig metal two processes are commonly followed in the blast-furnace, the one known as the cold-blast and the other as the hot-blast process, and the products are known in the trade as hot-blast iron and cold-blast iron. The cold-blast iron is low in silicon, and is especially adapted for chill castings, but its production is limited by the nature of the ore required and the small size of the furnaces it is practicable to work to advantage. The hot-blast iron, on the contrary, can be produced in any quantities desired, as there is practically no limitation either in quality of ore or size of furnace; but the hot-blast iron is high in silicon, and though well adapted for the Bessemer process is a non-chilling iron, totally unfit for the manufacture of chill castings.

The best chilling cold-blast irons will average 0-7 per cent. of silicon and about 4 or 5 per cent. of carbon, and the average yield of a furnace worked by the cold-blast will be from 8 to 12 tons of metal per day, but the hot-blast furnaces may be constructed to yield 80 or 100 tons per day. The cost of cold-blast charcoal chilling iron will run at the present time \$35 to \$40 per ton, while the hot-blast non-chilling iron can be procured at from \$17 to \$20 per ton. The main object of the present invention is to utilise the comparatively cheap hot-blast iron in the manufacture of chill rolls, car wheels, chill ploughs, malleable castings, and under all similar circumstances where the more expensive cold-blast charcoal chilling irons are now necessarily used, but the process is equally applicable to the treatment of light chilling irons where it is desirable to increase the depth of the chill. Having melted the desired quantity of pig-iron in a cupola or other suitable furnace, or, if convenient, taking such a charge of molten iron directly from the blast-furnace, he introduces it into a furnace where it can be treated by an air blast. For this purpose he prefers a Bessemer converter, wherein he submits the molten metal to the action of the air blast for a few moments, shutting off the blast either just before or just after the appearance of the carbon flame, varying the time slightly, according to the quality of the metal and the depth of chill required.

If only a small amount of chill is required he cuts off the blast just before the carbon of the metal begins to oxidise, which point can be determined by the increased strength of the flame with absence of the brilliant yellow colour. When a deep chill is desired the blow is continued until the brilliant yellow due to the oxidation of the carbon appears in the flame, but it is cut off before the disappearance of the silicon flame, or that flame which is seen at the commencement of the blow. The blow having been carried to the extent indicated according to the desired chill, is then cut off, and the metal poured into a ladle or other suitable vessel, and then directly into chill moulds or into sand moulds for the formation of castings, or pigs, which can be subsequently remelted into a cupola or other suitable furnace for the manufacture of chill castings. The whole process will usually occupy from one to five minutes, but

under some circumstances it may be necessary to continue the blow somewhat longer, especially if the hot-blast iron composing the charge be extremely high in silicon. The metal thus treated has not lost the qualities of cast-iron, but will be found to have acquired the qualities of the "cold-blast charcoal" chilling irons. It will be found to be very hard, of great strength, and if cast in a chill would, when broken, show long white crystals tapering into grey metal. When cast in sand moulds, if the chilling property is not too great, it will exhibit a dark grey colour and close grain resembling cold-blast charcoal iron, but if the chilling property be very high then the edges of the casting will be slightly chilled and the centre of the piece of light grey colour.

UTILISING TIN-PLATE SCRAP.—Great difficulty has hitherto been experienced in removing the covering metal from tin and terne plates, and the consequence has been that large mounds of scrap have accumulated in localities where the tin-plate manufacture is carried on. The chief object of the invention of Mr. HENRY EDMUNDS, jun., of Gracechurch-street, is to remove the coating of tin and terne plates in rapid and economical manner, and thereby not only to recover the more valuable metal, but also to bring the scrap iron into a state fit for working up again into plates. To this end he fuses the coating metal, and by centrifugal action removes the same from the iron. In carrying out the process he employs centrifugal apparatus so arranged as to admit of the scrap being readily placed therein and withdrawn therefrom, and of receiving a central fire for heating the scrap. The rotating cylinder or drum of this apparatus is fitted with a cage, which is packed with the scrap intended to be utilised, and in the centre of this cylinder and of the inserted cage is a fuel chamber for containing burning charcoal or its equivalent. When the cylinder is charged and the fuel ignited a rapid rotary motion is applied to the cylinder and its contents, and an induction of air to the ignited fuel is thus produced and maintained. The heat thereby generated is caused to impinge upon the scrap, and raise the temperature of the mass to a sufficient height to fuse the coating metal. The effect of the centrifugal action is to discharge the fused metal in the form of spray into the casing of the apparatus, and to leave the iron in a clean state. The cage containing the scrap is then to be removed and replaced by another charged with fresh scrap, and the operation may then be repeated. Instead of using a central charcoal fire the heat may be supplied from an adjacent stove. This will permit of the temperature being nicely adjusted to suit the work in hand, and thereby to prevent the volatilisation of the metal, as, for example, when zinc is required to be recovered, or otherwise injuring the substance under treatment.

SAFETY POWDER FOR USE IN FIERY COAL MINES.—A new powder which may be advantageously used in fiery coal mines as a substitute for gunpowder and other explosive agents now employed for blasting has been invented by Messrs. HUGHES and JONES, of Llangollen. They propose to use unslaked lime compressed into cartridges, or unslaked lime used loosely and well tampered down in the hole, using water or other liquid or liquefaction to saturate the lime. The advantages to be derived from the use of the powder are economy in the production of coal; making less slack than by using the ordinary blasting gunpowder; lives of colliers are less in danger, as by the use of the ordinary blasting gunpowder there is a flash of fire which often comes in contact and ignites the explosive gas in fiery mines; also breaking coal in the back is a special characteristic, as by the use of ordinary blasting powder its force in going out shatters the coal, and therefore much slack is made. The cartridge or the loose unslaked lime is placed in the hole, using water or other liquid or liquefaction to saturate it, and well tampered down with any substance to confine the expansion of the lime and the gas arising from it. It will not, like gunpowder, foul the air, nor does it create smoke, but rather tends to improve the quality of the atmosphere.

CONSUMPTION AND ASTHMA in all stages are instantly relieved by DR. LOCCOCK'S PULMONIC WAFERS, which taste pleasantly, and effects a rapid cure. In Bronchitis, Coughs, Colds, Whooping Cough, Phlegm, and all Disorders of the Breath, Throat, and Lungs, "they act like a charm." Price 1s. 1d. and 2s. 9d. per box.

HOLLOWAY'S OINTMENT AND PILLS.—Nervous debility often occurs in this season of the year in persons otherwise healthy, but who having overtaxed mind and body in some one of the many ways so common nowadays, suffer in consequence from an irritability of the whole nervous system, characterised more especially by sleeplessness, tremors, palpitation of the heart, and a general feeling of shakiness and sense of unstrung fibre, more distressing even than the actual pain. The muscular and vital energies in these cases seem almost as if they were utterly relaxed, and mental despondency sufficient to alarm anxious relatives and friends often accompanies this condition; no time should be lost, but immediate recourse had to these powerfully tonic and restorative remedies.

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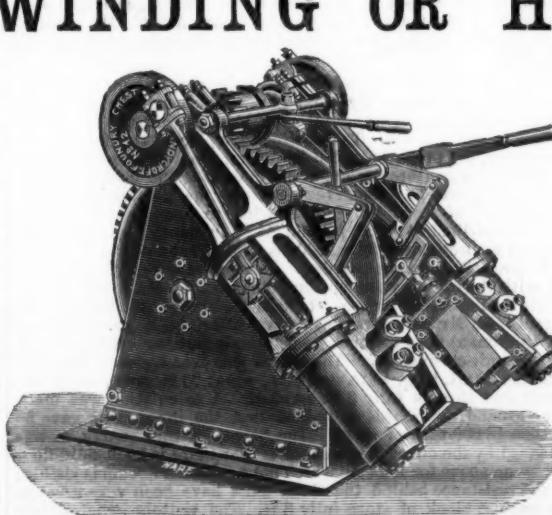
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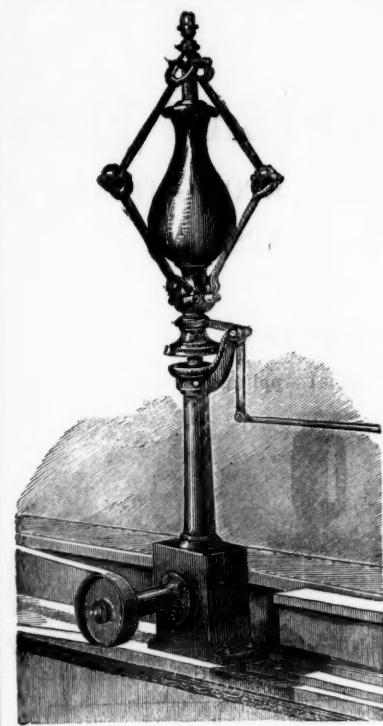
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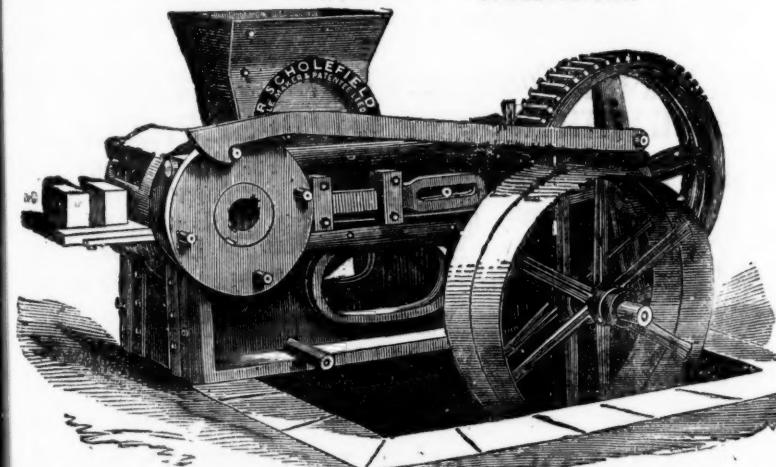
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production, and the hands required to make 10,000 pressed bricks per day:—

| | |
|--|--------|
| 2 men digging, each 4s. per day | £0 8 0 |
| 1 man grinding, 4s. 6d. per day | 0 4 6 |
| 1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day | 0 2 0 |
| 1 boy greasing, 1s. 6d. per day | 0 1 6 |
| 1 engine-man, 5s. per day | 0 5 0 |
| 1 man wheeling bricks from machine to kiln, 4s. per day | 0 4 0 |

Total cost of making 10,000 pressed bricks £1 5 0, or 2s. 6d. per 1000.

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

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Combines strength and efficiency with moderate cost, and supersedes all other modes of crushing ores.

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Mr. THOMAS BRANDRETH GIBBS, 122, Dunster House, Mark-lane, London.

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The valve chest is, according to the invention of Mr. JOHN SLEA, of Earlestown, Lancashire, cast with the cylinder, and it is bored out to receive a cylindrical valve, in the centre of which there is another cylindrical valve which is actuated by a spindle passing through a stuffing box in the valve chest, which spindle is connected by a rod with a lever having its fulcrum upon any convenient part from the bed, which lever is connected with the piston rod, so that the small central cylindrical valve moves with the piston, but to a much smaller extent. There is a port in the large cylindrical valve which keeps the central valve constantly supplied with steam, and there are ports in the small central valve which admit and cut off steam to ports in the large cylindrical valve which admit steam to the piston. There are ports in the large valve to open and close exhaust ports of the usual arrangement in the cylinder, and there are two ports in the large valve which are opened and closed by the small valve to admit steam to the ends of the large valve, and there is a small port at each end of the valve chest which communicates with the steam port for the piston.

In the cylinder the ports for steam and exhaust are separate and distinct, and when the piston has travelled nearly to the end of its stroke, that side of the piston which has the steam acting upon it uncovers the exhaust port and the steam escapes through the exhaust valve, and at the same moment the steam is exhausted through the passage for steam (which is at that time closed by the large valve), and this allows the steam at the opposite end of the large valve to move it over, at which time steam is admitted to the opposite side of the piston, the central valve having moved sufficiently to bring its ports in the position to do this, and so on for each stroke.

The barrel for the pump, whether for water or air, is made with a small passage or port at each end, the distance between the ports being equal to the thickness of the piston, so that when the piston for the pump arrives at or near the end of its stroke at either end, the small quantity of fluid in front of the piston may pass along the said passage to the back of the piston, and thus relieve the steam piston of pressure and gradually allow the pump slack valve to close.

PROPAGATION OF WAVE MOTION.

It is very largely suspected that many of the views concerning waves and wave motions now generally accepted as orthodox will have hereafter to be considerably modified, since careful experiment and research certainly do not bear out the conclusions which the more prominent members of the scientific world of the past generation, if not of the present, have arrived at. For some years past Mr. ALFRED TYLOR, F.G.S., has given special attention to the question of the propagation of motion in waves and tides, and his enquiries and experiments have now been carried far enough to permit of an intelligible outline of them being given. The leading objects of Mr. Tylor's researches have been to ascertain the mode in which undulations are propagated in water, and the bearing of the results obtained on the accepted theory of tidal waves and phenomena connected with them. The matter has been before the scientific world for nearly a year in consequence of Mr. Tylor's communication to the KK. Geographische Gesellschaft of Vienna, and is deserving of being at once popularised.

It appears that in conducting his experiments Mr. Tylor employed a specially constructed apparatus, consisting of a circuit of 24 feet of 10-in. glass pipe, laid horizontally, and provided with a box, in which waves could be generated by head of water of about 1 foot. Mr. Tylor found that a wave traversed the whole circuit under ordinary atmospheric pressure in 4'475 seconds, but that its velocity was so far diminished as to require 4'925 seconds to make its second circuit, which is equivalent to a loss of 9 per cent. of its velocity. A wave caused by the same head of water in the generating box, but moving in a partial vacuum (18 inches), took 4'76 seconds to complete its first circuit, and showed no calculable loss of velocity in making its second circuit. Mr. Tylor concludes from these results "that the velocity of a wave is dependent on the quantity of air which it has to move, and that a wave can only propagate itself until it has displaced its own weight of air," leaving out of account the loss of power due to friction and other obstructions. Upon this basis Mr. Tylor has constructed a formula which gives the limit of possible propagation of any given wave, and he shows that it is only when the number of undulations is equivalent to the weight of the wave that such wave will come to absolute rest. According to Mr. Tylor's formula, the limit of a wave of 240 ft. long, by 30 ft. deep, would be reached, at a distance of 208 miles, and this without taking into account any friction, but only reckoning the work done in displacing the air. At this point the wave would be reduced to 1 in. in height.

In an interesting series of experiments for ascertaining the waves or impulses propagated through water in a closed vessel, so arranged as not to allow actual movement of translation in the fluid, by means of a chronograph specially constructed, capable of measuring continuous operations, lasting 1-500th of a second, Mr. Tylor found, as the mean of two experiments, that an impulse of 10 lbs. was propagated at a speed of 39'7 miles per minute, through a $\frac{1}{2}$ -in. composition pipe, 97 ft. long, and completely filled with water. Comparing this result with the partly analogous case of an earthquake shock conveyed by the sea, Mr. Tylor refers to Dr. Frederick von Hochstetter's report on the earthquake at Arica, near Lima, in August, 1868, from which it appears the shock was recorded on the tide gauge at Newcastle, near Sydney, in Australia, as vibrations in the water, and not as an actual wave. The distance traversed being 7380 miles, and the time required by the shock to traverse this distance being 22 hours 28 minutes, gives a velocity of five miles per minute. In the earthquake of May 9, 1877, at Huanitos, on the coast of Peru, ships trembled through vibrations in the water, while similar vibrations are reported by Mr. W. H. Russell to have been recorded on the Newcastle tide gauge (Sydney) on the 11th of the said month, in answer to Mr. Tylor's enquiry whether the pencil of the tide gauge had not been in a tremble at that particular day. Observations show that the shock caused by the Lisbon earthquake in 1775 travelled six miles a minute to the West Indies.

The action of the tide on any coast is, in Mr. Tylor's opinion, rather the consequence of a series of impulses or vibrations than the result of material waves. He instances that a ship at ebb tide near London is 10 ft. below the level of the ocean, while at flood tide the same ship would be 10 ft. above the level of the sea. The level of the ocean in the meantime has not changed, although its whole mass has an alternate and opposite horizontal vibration twice in 24 hours. The impulse starting the tide on the Atlantic coasts must travel at the rate of at least 6 miles per minute; for it is seen that the greatest range of the times of the turn of the tide in the Irish sea (186 miles long) is only a few minutes. This has been ascertained by Capt. Beechey some 30 years since by anchoring boats at short distances around the whole coast, and observing that the tide turned simultaneously at all points. This turn of the tide, which is independent of high and low water, can only be caused by positive and negative impulses or vibrations from the Atlantic itself. Hence Mr. Tylor concludes that the term "tide" is a better one than "tidal wave," as no wave in the true sense of the word exists which could satisfy the theory held by many scientific men that a tidal wave travels round the earth at a speed of 1000 miles per hour, always in the same direction. On the contrary, the semi-diurnal movement of the tidal water is nearly equal and opposite. Mr. Tylor considers that the causes of the diurnal variation of the tide is due to the change of position relatively to the moon which each place goes through in 12 hours. That is, a place on the equator, 200,000 miles distant from the moon, may be 208,000 miles distant 12 hours afterwards; the earth having, during this time, made a semi-revolution, the place will be 8000 miles in a direct line further from the moon, and he states "that the cause of diurnal variation is due to the changes both of the angular incidence of the moon's attraction and the changes of the moon's absolute force of attraction, due to differences of distance at which that attraction acts, as well as the direction in which it acts, and the declination of the moon alone cannot be the sole direct or even principal cause of diurnal variation of the tide, though it has a very appreciable effect thereon."

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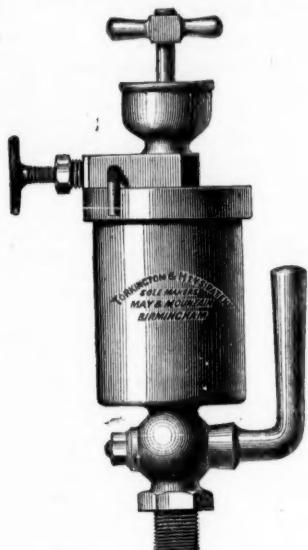
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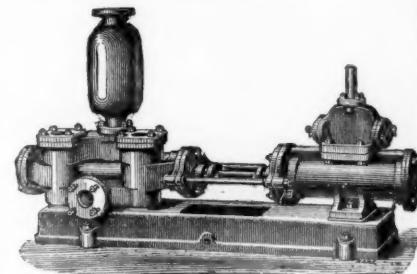
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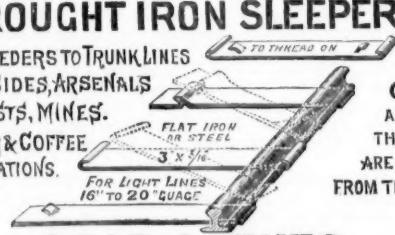
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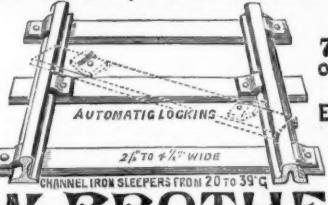
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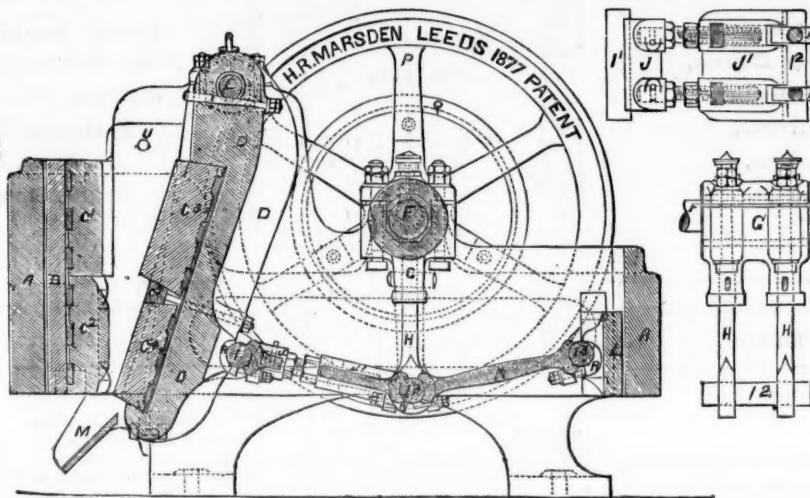
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